

TROPICAL DISEASES BUREAU.

SANITATION SUPPLEMENTS
OF THE
TROPICAL DISEASES BULLETIN.

APPLIED HYGIENE IN THE TROPICS.

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SUPPLEMENT No. 3.]

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[OCTOBER 30.

DISEASE PREVENTION.

REYNAUD. *L'oeuvre de la santé publique aux colonies.*—*Rev. Méd. et Hyg. Trop.* 1923. May–June. Vol. 15. No. 3. pp. 75–79.

The Congress of Colonial Medicine held at Marseilles in September, 1922, adopted, in full assembly, two resolutions, one being that a colonial hospital should be established at Marseilles; the other, that in every colony a committee of defence against "social" diseases in tropical countries—particularly against tuberculosis—be constituted.

SA (Carlos). *O serviço permanente de hygiene municipal em Minas Geraes.*—*Brazil Medico.* 1923. Apr. 28. Year 37. Vol. 1. No. 17. pp. 236–239.

By a Decree of March 14, 1922, permission was given to put into force plans proposed for a Municipal Health Service in Minas Geraes. Permanent sanitary posts were established at Oliveira, Itajubá and Barbacena, to the upkeep of which the State contributed 50 per cent., the local Council and the Rockefeller Foundation 25 per cent. each of the cost. Each post had the usual sub-departments—school inspection, hookworm, venereal disease prevention, dispensaries for free treatment of the poor, maternity and child-welfare, laboratory for diagnosis, etc.

Propaganda work was also carried on by means of lectures, conferences, posters, and so forth. Apart from these general measures, the Department has already been able to deal successfully with a small outbreak of amoebic dysentery and one of cerebrospinal fever, and is thus fully justifying its inauguration.*

FIGUEIRA. [**La Section d'Hygiène infantile du Brésil.**]—*Bull. Internat. de la Protection de l'Enfance.* 1922. Nov. No. 9. p. 723. [Summarized in *Bull. Office Internat. d'Hyg. Publique.* 1923. June. Vol. 15. No. 6. p. 849.]

A review of the child welfare clinic of Brazil. Out of 2,289 children under supervision, 1,265, or 62 per cent., were receiving an inadequate diet, 751 an improper diet; 567, or 24.8 per cent., showed symptoms of syphilis; of 535 children tested, 69 or 12.8 per cent., have given a positive reaction to the cutaneous test for tuberculosis.

ORENSTEIN (A. J.). **Compound Sanitation.**—*Proc. Transvaal Mine Med. Officers' Assoc.* 1922. Sept. Vol. 2. No. 5. pp. 1-15. (Discussion, pp. 15-19.) With 8 figs.; also *S. African Med. Record.* 1923. Mar. 24. Vol. 21. No. 6. pp. 122-133. With 8 figs.

Illustrations are here reproduced of the inside and outside of a native compound house (figs. 60 and 61), and of a fly-proof concrete rubbish bin (fig. 62) described by Dr. A. J. Orenstein before the Transvaal Mine Medical Officers' Association [see summary in Sanitation Supplements, No. 2 (1923), pp. 97-98].

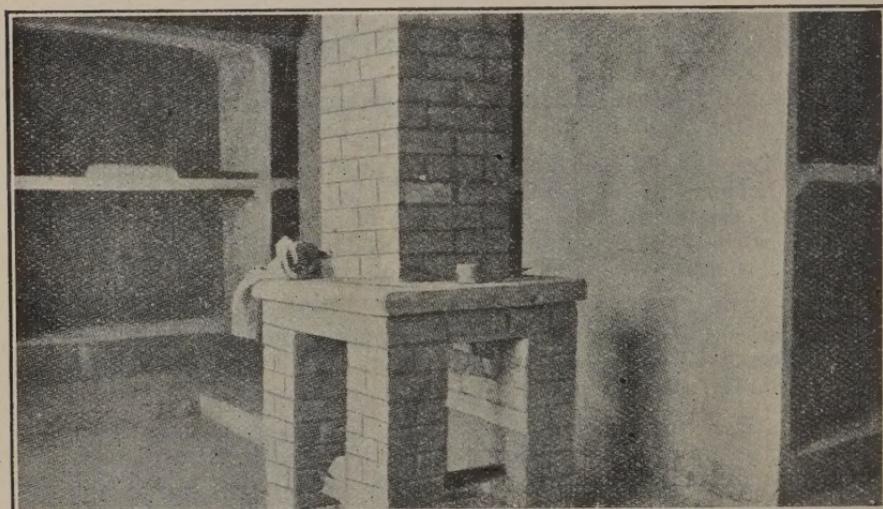


Fig. 60.—View of inside of Compound House, showing sleeping bunks and fireplace. [Reproduced from the *Proceedings of the Transvaal Mine Medical Officers' Association.*]

* Summarized by Dr. H. Harold Scott.

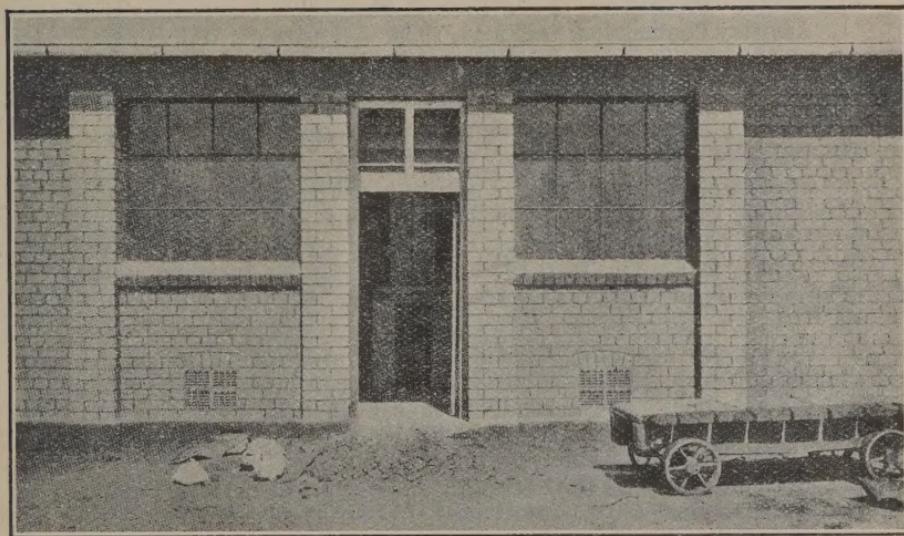


Fig. 61.—Outside of Compound House, showing ventilation.

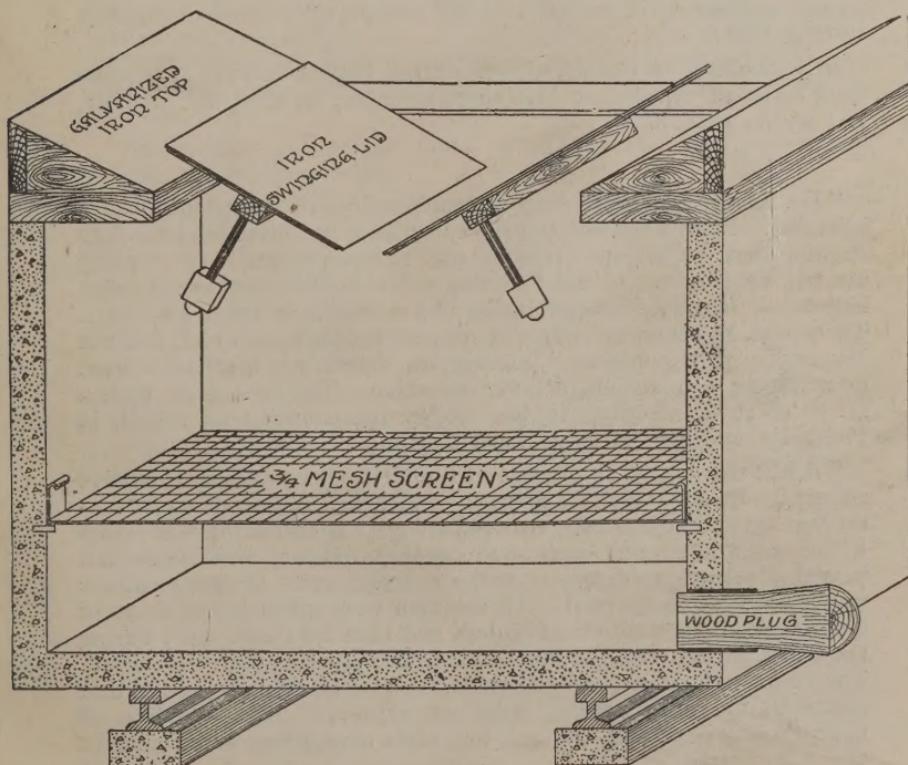


Fig. 62.—Shaw's Fly-proof Concrete Rubbish Bin.

[Reproduced from the *Proceedings of the Transvaal Mine Medical Officers' Association*.]

PALESTINE. **Proceedings of the Seventh Meeting of the Antimalarial Advisory Commission, 24th May, 1923.** [HERON (G. W.), Director of Health, President.] [MS. received from Dept. of Health, Jerusalem.]

The following extracts are taken from the proceedings of the antimalarial committee in Palestine:—

“ In the towns [the possible mosquito breeding-places] consisted of 4,193 wells, 10,761 cisterns, 15,932 cesspits and 24,187 other possible breeding-places—total of 55,073. In the villages there were 16,483 such places, making a grand total of 71,556 possible breeding-places, an increase of 8,969 over those recorded in the registers at the end of 1921.

“ The work in the towns consisted of 847,521 inspections, during which anopheles larvae were found 3,254 times, culex larvae 4,993 times, and both anopheles and culex 1,047 times. In 1921 there were only 771,405 inspections, but anopheles larvae were found 4,151 times, culex 5,433, and both anopheles and culex 1,437 times. That is to say, mosquitoes were found breeding in nearly 1·5 per cent. of the places inspected in 1921, but in only 1·1 per cent. in 1922.”

“ 2,033 places were made mosquito-proof by covering and other means, against 4,676 in 1921. 1,309 pumps were fitted, as against 1,149 in 1921.”

In Jerusalem “ in the last nine months of 1918 there were 113 deaths from malaria,” whereas in 1919 there were 35; in 1920, 30; in 1921, 17; and in 1922, 5.

“ Dr. Kligler read a paper on quinine prophylaxis and latent malaria infection. During the war and since, evidence had accumulated which showed that quinine prophylaxis was not efficacious in preventing malaria epidemics. In the last two years in Palestine ample proof had been obtained in confirmation of the results of other observers. There was, however, one effect of quinine prophylaxis which had not been sufficiently emphasized, namely, its tendency to mask infections, or maintain a condition of latent infection. The note dealt with a series of such infections in two highly malarious areas, Athlit, in Phoenicia, and Ein-Harod, in the Valley of Jezreel.

“ Athlit was a small settlement surrounded on two sides by extensive swamps. In July, 1922, a company which had obtained a salt concession began its operations near the village. A tent camp was set up within a few hundred metres of the swamp. Before three weeks had passed a serious epidemic of malaria broke out. Heroic measures were immediately adopted. All the men were given heavy doses of quinine (2 grams daily) for five days and then 2/3 grams daily during the entire period. At the same time active petrolization was started. The swamps, however, were so extensive and breeding so active that complete mosquito control was not achieved. The breeding of mosquitoes was greatly reduced, but adult mosquitoes were found on every inspection.

“ The first results of the control measures were excellent. The cases dropped rapidly and were kept under control until December 15,

when the bulk of the men were dismissed. The results were shown in the following table:—

Malaria Incidence in Athlit.

	No. of Men.	No. of Cases.	Per cent. Incidence.	Days Lost.
July ..	80	39	50	315
August ..	150	43	30	262
September ..	200	20	10	132
October ..	200	13	6.5	105
November ..	200	23	11.5	125

“ The figures given in the table showed good results, but there was another side to this picture which was not so pleasing.

“ Prior to the dispersal of the men, quinine distribution was stopped for four days and the blood of 112 men examined. Thirty parasite carriers were found in these 112 men; 27 malignant tertian and 3 benign tertian—4 of them with gametes. In other words there were at least 26.8 per cent. active parasite carriers in the camp.

“ The greater number of these men were dispersed to various parts of the country before intensive treatment could be carried out. Each of the 30 parasite carriers thus became a new focus for the dissemination of malaria.

“ About 60 men remained behind in Athlit. Quinine prophylaxis was stopped in order to give the men a chance to receive malaria attacks and proper treatment. The number of relapses during the months of December, January, February and March totalled 51; about 75 per cent. of the men relapsed once and 10 per cent. had two or three relapses.

“ The conclusion from the results presented above were good or bad according to the view-point.

“ 1. From the public health standpoint, the effect of the quinine was decidedly harmful. By maintaining a condition of latent infection there was a large increase in the number of carriers and also in the number of cases of chronic malaria extremely resistant to treatment.

“ 2. From the standpoint of the company the results may be said to have been good, because the prophylactic quinine reduced the sick rate and resulted in an economic gain.

“ There was no question, however, that the only point of view which could be considered was that of the public health.

“ Another instructive instance of the danger of quinine prophylaxis was an epidemic which broke out among the infants of Ein-Harod late in January and early in February, 1923. Ein-Harod was a new settlement in the Valley of Jezreel. The settlement was surrounded on three sides by breeding-places. To the west was the Wadi Zarain, to the north the Jaloud stream, and to the east an extensive swamp created by the mill-run of a flour-mill on the Jaloud. Breeding was active everywhere and efforts at checking it only partially successful.

“ In the settlement there were 12 infants who were kept in a separate nursery under the special care of a nurse. Quinine was administered to these infants daily with great punctiliousness by the nurse herself. The children continued quite well and during the epidemic season only two of the infants had malaria.

“ On January 24 quinine distribution was stopped in order that a general blood examination of the entire population might be made.

On January 29 one of the infants became ill with malaria. The blood was examined by the local physician ; at first the blood was negative, but repeated examinations revealed a few rings diagnosed as malignant tertian malaria. Between that day and February 15, 11 of the 12 infants became sick with malaria, and, according to his report, the physician found, with difficulty, and often only after repeated examinations, parasites of malignant tertian malaria in their blood.

"There could be little doubt that this outbreak was not a fresh epidemic, but an awakening of infections which had been kept latent by the quinine. During the second week of January the stables of Ein-Harod were smoked out and the wintering mosquitoes killed. A second smoking made on January 20 revealed no mosquitoes in the places previously smoked and a number of *A. elutus* in a stable not previously smoked. Thereafter only one or two anopheles were found after repeated search. During the months of January and February no anopheline larvae were noted in the various inspections made. There was no corresponding epidemic among the adult population. The parasites were more difficult to find than would have been the case in fresh infections.

"This then was another instance of the masking of malaria infections by quinine prophylaxis. The effect was evidently the same whether employed among adults or infants. The only value, and that a doubtful one, was the postponement of the attacks to the non-epidemic season. It was a question, however, whether from the public health standpoint a masked carrier, even though the parasites were under the influence of quinine, was not more dangerous than a patient under observation. Quinine prophylaxis might have its value, but the danger lurking behind it was as great, if not greater, than the benefit derived from it."

SCHARFF (J. W.). **Notes upon an Antimalarial Campaign in Bukit Timah Village.**—*Trans. Malaya Branch Brit. Med. Assoc.* Session 1922-23. No. 11. pp. 32-36. With 1 fig.

The writer gives an interesting account of the malaria in the village named. In 1921 the malaria parasite rate was 83 per cent. in a total of 196 patients admitted from all causes to hospital ; in 1922 the average spleen index of the village was 42 per cent., and in the children nearly 74 per cent.

Antimalaria work was commenced in 1922 and was confined at first to oiling and drainage ; subsequently financial provision enabled a satisfactory staff, with a trained inspector, to be entertained ; propaganda was also carried on.

At first all breeding-places of *A. maculatus* were oiled, Hacker's mixture of 2 parts of solar oil to 1 part of liquid fuel being used with oak sprayers. Later, subsoil drainage was commenced, as a very large number of breeding-places existed in thin sheets of surface water and in pockets in ravines. In the subsoil drains that have been found most satisfactory stakes are used to hold down the pipe and to act as channels down which the seepage water gravitates towards the pipe. The pipes are laid and covered with the fronds of coconut trees, which give support and keep out silt. [Fig. 63.]

"Altogether 9,043 feet of pipes have been laid ; 3,381 feet of stone and rubble drains, 18,636 feet of earth channels have been cut and

[?] 1,998½ gals. of oil mixture have been sprayed in this area during the past seven months."

The approximate costs from August, 1922, to February, 1923, charged against the Antimosquito Vote are as follows :—

1. Pipes : 1,244 8-in. pipes @ 21 c. each	\$261.24
7,799 6-in. pipes @ 12½ c. each	974.88
	<hr/>
2. Oil : 557½ gals. of liquid fuel @ 22 c.	122.65
1,115 gals. of solar oil @ 29 c. per gal.	323.35
	<hr/>
3. Labour : Average of 26 men @ 50 c. and 3 mandores @ \$30 for 7 months, and 1 mason @ \$30 for 3 months	3,349.00
4. Sanitary Inspector : 1 @ \$150 per mensem (charged to Rural board).	
5. Cement and implements, etc.	580.00
TOTAL, exclusive of Sanitary Inspector	<hr/> \$5,611.12

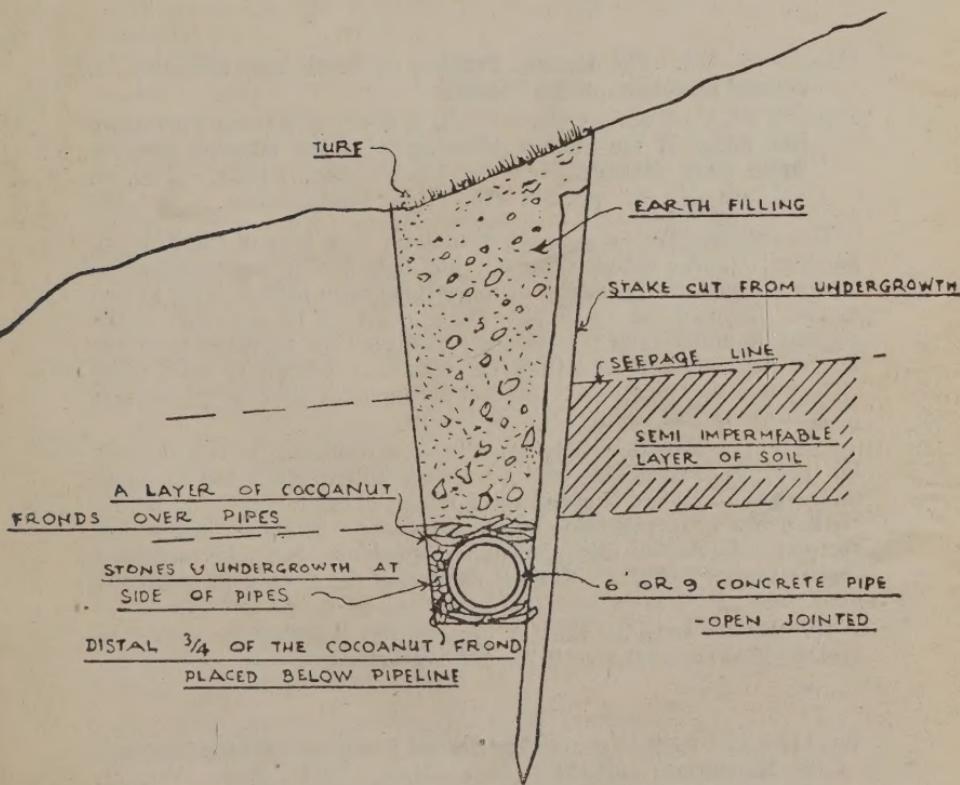


FIG. 63.—Section of Subsoil Drain used in antimalarial campaign in Bukit Timah Village, showing stake inserted to hold down pipe and act as channel down which the seepage water gravitates towards the pipe; also showing layers of coconut fronds above and below the pipe to give support and keep out silt.

WELCH (S. W.). **Malaria Control Work in Alabama.**—*New Orleans Med. & Surg. Jl.* 1923. July. Vol. 76. No. 1. pp. 6-8.

The writer describes the decline of malaria during the past five years in the State of Alabama. The number of counties free from malaria is doubled, the number in which it has become "moderate" is reduced by one-third, and the malaria problem is no longer serious in any county.

In six counties in 1917 the death-rate from malaria was only 5 per 10,000 of the population, so that although the disease was worth combating it did not assume any very grave proportions.

Ordinary methods were made use of, the writer particularly stressing the use of gambusia as being the most satisfactory and the cheapest.

In the discussion which followed, Dr. W. LEATHERS pointed out that during the past seven years funds for public health work in the 11 Southern States has been increased 314 per cent., whilst the remaining 37 States of the Union had increased about 145 per cent., showing that the south were ahead in the matters of adequate funds.

MAXCY (K. F.). **The Malaria Problem of South East Missouri. I. General Discussion of the Locality.**

ZIEGLER (M. V.) & MAXCY (K. F.). **II. A Study of Malaria Prevalence and Some of the Factors affecting it in the Sikeston Area of South East Missouri.**—*Public Health Rep.* 1923. Feb. 9. Vol. 38. No. 6. pp. 233-250. With 1 map in text.

The authors give an account of malaria in a part of the State of Missouri, U.S.A., noting especially the difficulty of ascertaining the amount of malaria present. In a low-lying tract in this State known as the "Plan of the Little River" as many as 15 per cent. of the population suffer from malaria, but owing to the movements of the tenant population to and from the hills it is difficult to start satisfactory remedial measures; this fact accounts for much of the malaria present in the hill section.

The tenant farmers have no great pride of ownership in their houses, the majority of them stay only a few years in one place, and therefore they are not prepared to spend much money in improving the structure of the house or in providing mosquito-netting. Moreover, the people are poor and seldom call in medical attendance, but take medicines themselves for "chills." Chronic carriers of the disease are relatively numerous.

The writers consider that at present the chief efforts should be concentrated on the individual houses and schools.

WU LIEN TEH (G. L. Tuck). **The Second Pneumonic Plague Epidemic in Manchuria, 1920-21.**—*Jl. of Hyg.* 1923. May. Vol. 21. No. 3. pp. 262-288. With 1 map in text.

The writer gives a long and detailed account of the epidemics of plague in Manchuria. We have already reviewed this in the Annual Reports issued by the same author [Sanitation Supplements, 1922, pp. 113 & 174]. Those requiring a detailed account of plague in the various districts of Manchuria should refer to the original article.

WU LIEN TEH (G. L. Tuck), CHUN WING HAN & POLLITZER (Robert).
Plague in Manchuria. I. Observations made during and after the Second Manchurian Plague Epidemic of 1920-21. II. The Rôle of the Tarabagan in the Epidemiology of Plague.—*Jl. of Hyg.* 1923. May. Vol. 21. No. 3. pp. 307-358. With 3 plates. [Refs. in footnotes.]

i. This paper contains an account of the laboratory experiments made during the epidemics already described. The details do not lend themselves to review; the conclusions, however, are given in the authors' own words.

“ (1) We found that the *B. pestis* present in plague sputum, although more resistant than *in vitro*, was killed within nine hours by direct sunlight at a winter temperature (-3°C .).

“ (2) Mere drying of plague sputum, irrespective of other factors, e.g., temperature, humidity, is not a sufficient test of the killing of *B. pestis* under all circumstances. We have cultivated *B. pestis* from seemingly dry sputum in 40 per cent. cases after exposure in Petri-dishes to sunlight, and in 60 per cent. cases when exposed upon wood or surgical gauze.

“ (3) Disinfectants and antiseptics, even in strengths above those usually recommended, have not the generally expected results upon plague sputum. For instance, carbolic acid lotion, 1 : 10, requires five minutes to prevent growth of *B. pestis* in sputum. Concentrated alcohol (methylated spirit) is the surest means of sterilizing the hands and gloves in plague work.

“ (4) Rooms where patients have died of pneumonic plague do not seem particularly dangerous. A modern-built, steam-heated room, with tightly fitting windows and protected from draughts, appears more dangerous than old-fashioned native houses.

“ (5) The disinfection of grossly contaminated articles, like floors, walls, etc., is necessary. The problem of fumigation of the air-contents remains an open one.

“ (6) The infectivity of clothing as a means of propagating pneumonic plague cannot be neglected.

“ (7) The existence of plague carriers has been proved in the 1921 epidemic.

“ (8) The Mukden cotton-and-gauze mask, when properly applied, is the best means of personal protection against infection by inhalation. For those in constant and immediate contact with patients, we would advise the wearing of an additional hood with silk-piece sewn on in front, besides the use of goggles.

“ (9) Pigs and birds were found to be non-susceptible to highly virulent fresh material.”

ii. Conclusions from experiments upon Tarabagans.

“ Our experiments prove that, once started, plague among tarabagans may lead to two, possibly three, degrees of the disease. These are (a) an acute form with all the familiar features; (b) a chronic localized form, showing quite unusual manifestations; (c) possibly a 'carrier' form marked by slight deviations from the normal found during and after life.

“ Of the acute form no more need be said, as its nature and character are well known. In the chronic localized form we have seen an animal

survive for six months and then die spontaneously, showing at death marked pericarditis. Another animal, surviving for 17 days and then killed by chloroform, displayed several abscesses in both lungs and would certainly have lived longer if we had allowed it. These two animals obviously harboured virulent plague organisms and under favourable circumstances could have communicated the disease to man. Regarding the third category, plague-like bipolar-stained bacilli were found in small numbers in the blood and organs, but we were not able to satisfy ourselves about the cultures or their infectivity. The fact remains, nevertheless, that this type of animal might serve, besides the chronically diseased tarabagans, as hosts for the plague bacillus. Moreover, it appears not impossible for this supposed carrier to 'light up' under favourable conditions, and become actively infective."

Summary of Conclusions.

"(1) The existence of sporadic cases of natural plague among tarabagans has again been established.

"(2) The tarabagan is easily susceptible to pneumonic plague produced by the inhalation of *B. pestis* in spray form, and may contract, besides the acute infection, chronic type of the lung affection.

"(3) Our inhalation experiments have proved contacts to be liable to pulmonary plague infection in both acute and chronic forms. The existence of carriers among tarabagans seems also probable.

"(4) Tarabagans can be infected with plague by feeding upon artificial infected food, contracting an alimentary type of the disease. The *B. pestis* is easily cultivated from the intestinal tract of animals suffering from plague.

"(5) Our evidence shows that subacute or chronic plague may exist among tarabagans in Mongolia and Siberia and thus form a connecting link in the epidemiology of plague in those regions."

RAYNAUD (Lucien). **La lutte contre le typhus exanthématique en Algérie.**—*Bull. Office Internat. d'Hyg. Publique.* 1923. July. Vol. 15. No. 7. pp. 965-973. With 4 text figs. [1 ref.]

The writer describes the outbreaks of typhus fever which occurred in Morocco during the years 1920-23 and the special arrangements for combating the disease. In 1921 there were 2,548 cases, with 52 deaths; in 1922, 658 cases, with 92 deaths.

The method of prevention followed the usual lines, namely, erecting of stations where patients could be bathed and have their clothes freed from parasites of all kinds. The clothes were treated with SO_2 in a specially constructed portable chamber. The SO_2 was supplied in four-kilogram cylinders and cost 2.50 francs. The chamber, in which the clothes are hung during fumigation, is shown in detail in the accompanying figure. It is made of canvas prepared with linseed oil; the top and bottom are of wood, the supports are of aluminium and can be taken apart and re-erected. The sack is $1\frac{1}{2}$ metres high, and 90 cm. broad and weighs complete 16 kg. [Fig. 64.] For permanent establishments a chamber of 7 or 8 c.m. is necessary. At a temperature of 20° or 30° C. 70 gm. of SO_2 is sufficient to disinfect 1 c.m.

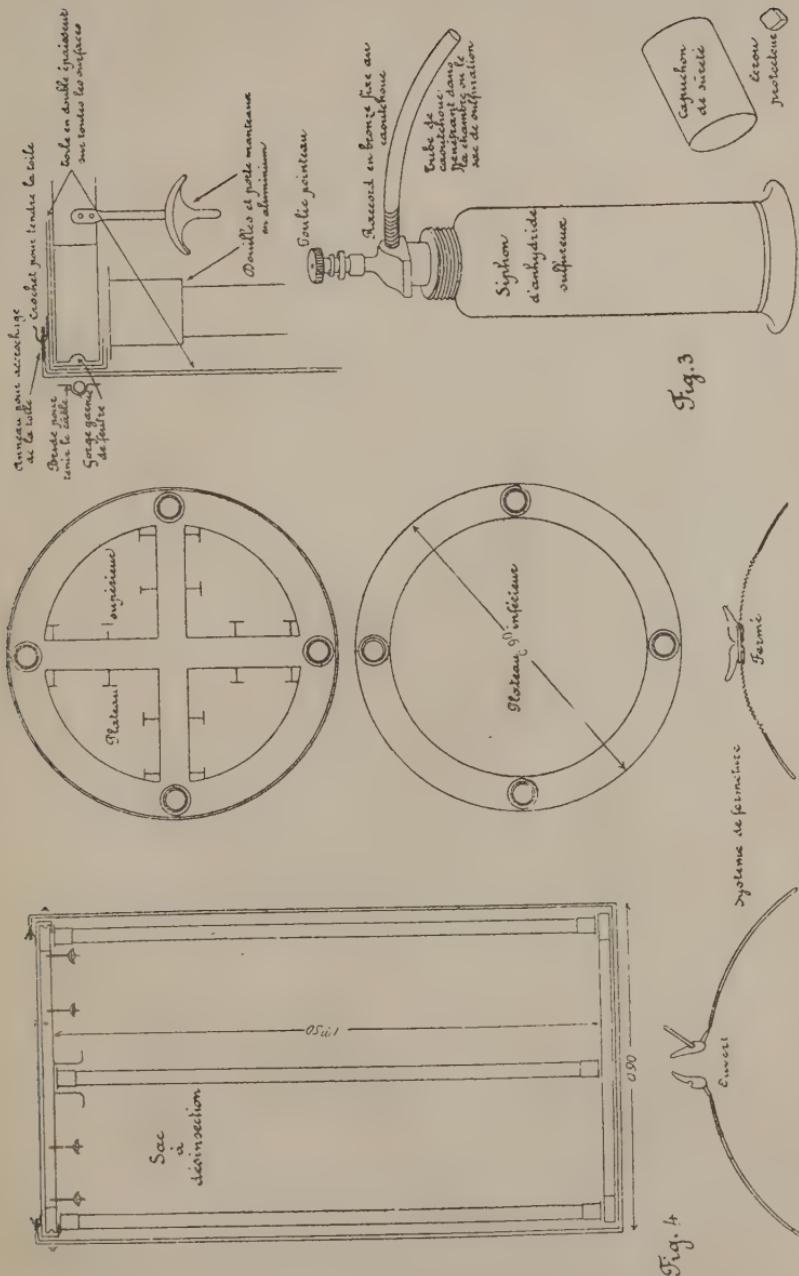


Fig. 64.—Portable Fumigation Chamber of canvas treated with linseed oil used in antityphus fever work in Morocco.

[Reproduced from the *Bulletin de l'Office International d'Hygiène Publique*.]

BRITISH GUIANA. British Guiana Society for the Prevention and Treatment of Tuberculosis. Sixteenth Annual Report of the Committee, 1922. [GONCALVES (M.), President, and HASLAM (John F. C.), Hon. Secretary.]—15 pp. 1923. Demerara: Printed by "The Argosy" Company, Limited.

Statistics of Tuberculosis.

—	Notified Cases.		Deaths.		Death-rate per 1,000 of population.	
	1922.	1921.	1922.	1921.	1922.	1921.
Whole Colony ..	451	368	387	452	1·3	1·5
Georgetown ..	176	147	121	135	2·2	2·4
New Amsterdam ..	50	22	19	24	2·2	2·8

The following items are worthy of note:—

"In Russel Street, Georgetown, in a house 16 ft. by 18 ft., and 10 ft. high, lived a man and woman and six children. The father died of tuberculosis, one son now has the disease and three other children are under treatment for suspicious lung trouble.

"In the lands adjoining the railway line, Georgetown, is a two-roomed house, each room 12 ft. by 10 ft., and 8 ft. high, and the occupants are seven adults and a child, among whom are two cases of consumption.

"In Albert-town, Georgetown, is a tenement room, 10 ft. by 10 ft. and 10 ft. high, occupied by an adult with advanced consumption and seven other persons between 7 and 23 years. Two of the seven have already been infected.

"In Kitty Village is a small house, 18 ft. by 12 ft., divided into two rooms, and in the inner room sleep nine children and five adults, among whom two cases of consumption have occurred.

"In the course of visiting work there have been distributed free 9,521 pints of milk, 36 respirators, and 181 pints of disinfectant, and several deserving persons have received poor law relief through the agency of the Society."

MHASKAR (K. S.) & KENDRICK (J. F.). Anti-Hookworm Campaign in the Tea Estates of Madras.—*Indian Jl. Med. Res.* 1923. July. Vol. 11. No. 1. pp. 52-64.

The writer gives an interesting account of an anti-hookworm campaign, his conclusions are as follows:—

"The average incidence and intensity of hookworm infection is much the same in coolies on the tea estates as in the districts they come from [*i.e.*, 100 per cent. infection]. Adult men harbour on the average 68 worms per person, women 40, and children 30 worms per person. The infection varies in intensity among the different communities and is highest (169 worms per person) in the Panchamas, who, as a class, have little or no conception of cleanliness.

"The haemoglobin average of 70 per cent. is the same as that in coolies in the plains. There is no correlation between the haemoglobin average and the number of hookworms harboured.

"One dose thymol or betanaphthol treatment without purgatives is simple and effective, one treatment being sufficient to reduce 90 per cent. of hookworm infection. The betanaphthol treatment should, for the present, like the thymol one, be considered not altogether safe. As no previous microscope examination is necessary, and as the drug need be administered but once, the treatment is likely to find favour with the masses.

"Treatments administered in the morning on a fasting stomach yield the best results.

"All other things being the same, thymol treatment at 1 anna and 11 pies per head is decidedly more costly than the betanaphthol treatment at 8 pies per head.

"Freedom from hookworm infection diminishes the morbidity and mortality rates and increases the marketable value of labour."

KNOWLES (R.). The Calcutta School of Tropical Medicine and its Programme for Research.—*Proc. Assam Branch Brit. Med. Assoc. Ann. Meeting Hafsloung.* 1923. Jan. 7. pp. 20-51.

This address is certainly the most interesting that has appeared in the annals of tropical medicine for very many years. It deals with two aspects of the subject: (1) the growth of the School of Tropical Medicine in Calcutta, and (2) the research work that has been accomplished in that institution.

As regards the former, space forbids us to go into details. As regards the latter, there is so much that we should like to quote that we are practically bound to have recourse to the method of recommending officers abroad to obtain copies and read the original paper for themselves.

The subjects dealt with comprise kala azar, malaria, including treatment by quinine and its alkaloids, dysenteries, cholera, lathyrisms, epidemic dropsy, ankylostomiasis, leprosy, etc.; individual abstracts will be found in the respective sections of the *Bulletin*, and a brief general review of the whole in Vol. 20, pp. 755-757; consequently we shall deal in this place only with the subject of ankylostomiasis.

Dr. MCVAIL'S "method of diagnosis of hookworm infection is simplicity and reliability itself. Across a glass microscope slide, half an inch from each end, draw a blue grease-pencil line. Make a thick emulsion of the suspected faeces and pour it on to the slide so as to cover the space between the grease lines with a considerable depth of fluid. Let it stand for 10 minutes: the ankylostome ova settle down and adhere to the glass by virtue of their sticky capsules. Next fill a bowl with clear water. Taking the slide by its ends with both hands tilt it, and very gently immerse it under the water, and gently draw it out. All faecal matter is washed off and the ova are left adhering to the glass. This simple little technique is utility itself in diagnosis."

The researches of Dr. MCVAIL show that larvae are capable of penetrating clothing and even stitch holes in boots, consequently dressing boots with linseed oil is recommended. The work on septic tanks has already been referred to. Dr. MCVAIL is a great advocate for the use of carbon tetrachloride, given in 60 minimum doses, as a

method of treatment. The cost is only one anna and a half (one-eighth of that of chenopodium oil) per case, and a single dose will thoroughly rid a coolie of the worms and leave him fit for work the following day.

LONGLEY (F. F.). **Can the Benefits of the Hookworm Campaign be made lasting?**—*Health*. Melbourne. 1922. May. Vol. 1. No. 5. pp. 139-142.

The writer discusses the general aspects of hookworm control. He points out that by treating patients a great deal can be effected, but that for permanent sanitation pollution of the ground must be prevented.

One gathers that the main difficulty in Australia is to design a suitable and cheap privy for a very scattered population where latrine conservancy is impossible. He describes the conditions in Australia and particularly the dangers of the ill-kept and partially tumbled down latrines. In Queensland an energetic endeavour has been made to bring all privies up to a standard which will minimize the risk of soil pollution. The door for the removal of the closet pan should be in the front of the pan enclosure, that is, inside the privy, so that anyone using the privy would close the door if he found it open. This protected position prevents the warping of the door. He also points out that many Government offices have entirely unsuitable and insufficient latrine accommodation.

The writer does not give much of his personal experience as to the particular type of closet suitable to Australian conditions.

SAWYER (W. A.). **Hookworm Disease as related to Industry in Australia.**—*Amer. Jl. Trop. Med.* Baltimore. 1923. May. Vol. 3. No. 3. pp. 159-176. With 2 text figs. [5 refs.]

The writer gives an account of the prevalence of hookworm disease in mines and amongst the agricultural population in Australia. Speaking generally, the disease is confined to two groups of coal mines, but is almost absent from most of the other mines in the country.

The surprising fact was noted, in culture, that some highly mineralized mine waters permitted the development of larvae; one such water contained as much as 3.4 per cent. of total solids, including a considerable amount of zinc sulphate. (In testing the effect of this salt it was found that sand cultures wet with 3.5 per cent. solution inhibited the development of larvae, whereas a 4 per cent. solution in charcoal cultures did not. NaCl solution of 2 per cent. had the same inhibitive effect, but 1.5 per cent. had not.)

None of the water in the infested mines contained more than 0.7 per cent. of total solids, and 0.3 per cent. of sodium chloride. In these mines a specially designed latrine was recommended and it was strongly advocated that no workers should be employed underground either with bare feet or with leaky boots. This was particularly necessary, because many of the colliers were both barefooted and nude from the waist up.

It was shown that hookworm disease is about 50 per cent. more prevalent amongst children of school age than amongst the agricultural workers, and that it cannot in general be classed as an industrial disease of cultivation.

The most important single factor localizing hookworm in the Australian tropics and sub-tropics has been the variation in the

amount of rainfall, for infestation is practically absent in the white population, where the average annual rainfall is less than 40 in.

The children of Queensland particularly get most of their infection from the home and in places where they play barefooted. The agricultural labourer usually wears boots, and the ground with which he deals is not usually highly polluted. Boys have been noticed to be more infested than girls, as older girls are much more inclined to wear boots than their brothers of the same age.

COMBY (J.). *La défense du Maroc contre la syphilis.*—*Bull. et Mém. Soc. Méd. Hôpital de Paris.* 1923. May 31. Vol. 39. (3rd Ser.) No. 18. pp. 736-743.

The writer gives an account of syphilis in Morocco, both town and country, and the measures for its control. According to the most hopeful estimate, 50 per cent. of the population are infected, but some put the figure as high as 60 to 70 per cent.

In his opinion the most promising method of fighting the disease is by means of special dispensaries and the intelligent use of the regulations as regards prostitution.

The injection of "606" and "914" gave most satisfactory results amongst the native population. Gradually the people are beginning to appreciate the value of these remedies and indeed to demand them.

The matter is entirely one of money. At one dispensary in Rabat in 1922 over 2,000 injections were made free. In March of the next year 2 francs was charged and the figure dropped down to 866. Consequently, if success is to be attained a large budget allotment will be required.

During the discussion on this paper Dr. QUEYRAT remarked that in an experience of over 30 years and 500,000 injections he had only three accidents. During the war a further 80,000 injections were made without any deaths. He considers that a budget allotment of 20 million francs spread over several years would be necessary to diminish the ravages of the disease, but with this sum it would be possible to insure success.

KINLOCH (J. Parlance). *The Aberdeen Epidemic of Milk-borne Bacillary Dysentery, March to May, 1919.*—*Jl. of Hyg.* 1923. Aug. Vol. 21. No. 4. pp. 451-457.

In March to May of 1919 an epidemic of bacillary dysentery, which was spread by milk, occurred in Aberdeen. The circumstances were briefly as follows:—

The dairy in question was one of the largest in the town and received its milk from something like 36 different sources. After a careful investigation it was found that in one farm the farmer's wife and two children had suffered from diarrhoea at the origin of the epidemic and at the time of investigation one milkmaid was actually ill and had been so for about a week. (The farmer's sister-in-law, who was living at the farm, had been a nurse in Salonika during the war, but she had never had dysentery; and examination of the stools on three occasions was negative.) The milk from this farm was put into a large vat containing 500 gallons, with that from other sources in the dairy, so that infection could be spread by any portion of this large quantity.

"Of 650 of the cases in which the sex was determined, 249 were males and 401 females, giving a proportion of 38 per cent. of males to 62 per cent. of females. Of 657 cases in which the age distribution was determined, it was found that 2.9 per cent. were aged 0-2 years, 5.2 per cent. were aged 2-5 years, 7.9 per cent. 5-15 years, 12.2 per cent. 15-25 years, 32.1 per cent. 25-45 years, 27.5 per cent. 45-65 years, and 12.2 per cent. 65 years and upwards."

Conclusions.

"1. An epidemic of diarrhoea or gastro-enteritis occurring in Aberdeen in 1919, and causing over 1,000 cases and 72 deaths, has been proved to be due to infection of milk with dysentery bacilli of the Flexner type.

"2. Similar epidemics of milk-borne diarrhoea have occurred formerly, but bacteriological investigation had failed to determine the nature of the infecting organism. Reference to the epidemiological and clinical features of such former epidemics, however, makes it practically certain that they were essentially of the same description as the Aberdeen epidemic of 1919, and accordingly indicates that they were likewise due to infection of milk with dysentery group bacilli.

"3. The Aberdeen epidemic of milk-borne bacillary dysentery had run its course and had caused 72 deaths before serological proof of bacillary dysentery was available. Since the time of the Aberdeen investigation notable advances have been made in methods for the bacteriological diagnosis of the dysenteries as a result of the fundamental work of F. W. Andrewes, A. D. Gardner, C. J. Martin, and others. Nevertheless, modern methods of bacteriological diagnosis are not infallible, and the Aberdeen experience clearly indicates that deaths will be prevented if polyvalent antidysonteric serum and saline treatment are used at once in a disease having the clinical symptoms of bacillary dysentery, or in an acute enteritis from which has been isolated organisms with the cultural reactions of the dysentery group bacilli."

WATER.

Houston (Alexander). **Metropolitan Water Board. Seventeenth Annual Report on the Results of the Chemical and Bacteriological Examination of the London Waters for the Twelve Months ended 31st March, 1923.**—90 pp. With 8 diagrams & 44 photographs. 1923. London: P. S. King & Son, Ltd., 2 & 3, Great Smith Street, Westminster. [Price 15s.]

"SECTION I (pp. 11-15).

"*Chlorination of Thames River Water.*—23,013.5 million gallons were treated, the average dose being 1 in 2.45 millions, at an estimated saving of £16,048.64. The bacteriological results were better than if the water had been stored in the Staines reservoirs for over a month, the treated water was quite innocuous, and there were no complaints as regards taste.

" SECTION II (pp. 15-18)

"Chlorination of the New River Water.—Another year of treatment has passed, and it is a great thing to be able to say that it is now possible to remedy the bacteriological deterioration of the water during the winter floods and without giving rise to taste troubles. 3,348 million gallons were treated at a nominal cost of £245. In point of fact, a great saving is involved, as the interest on the capital expenditure for remedial works to render the New River pure during floods would far exceed the small sum required for chlorination. The average dose of chlorine was 1 in 3.34 millions. The bringing of the New River to London by that great citizen Sir Hugh Myddleton was an epoch-making event. Three hundred years later much humbler men, but imbued with the same ideals, have sought to banish the imperfections of the New River during floods and so add to the security of London consumers.

" SECTION III (p. 19).

"Deptford (Twins) Well Chlorination Treatment.—The duration of contact between the chlorine and water is excessively short, for engineering reasons which need not be gone into here. Partly on this account, but also to overcome taste troubles, super-doses of chlorine have been employed and the excess removed by a dechlorinating agent (SO_2). The results have been so highly successful and have aroused such widespread attention that an extension elsewhere of super-chlorination and dechlorination methods is almost bound to follow.

" SECTION IV (pp. 20-21).

"Suspended Solids in Thames River Water.—Since November, 1920, the suspended solids in Thames river water have been determined gravimetrically. The weight in pounds per million gallons of suspended matters was 27 and 629 for the weeks ended September 3, 1922, and January 7, 1923, respectively. The remarkably different effect rain produces according to the season of the year is well exemplified by taking the four weeks ended July 23, 1922, and comparing them with the four weeks ended January 14, 1923. The rainfall during the first period was 4.8 in., yet the average flow of the river was only 622 million gallons and the suspended solids 64 lb. per million gallons. During the second period the rainfall was 4.79 in., yet it raised the flow to 2,886 million gallons and the suspended solids to 440 lb. per million gallons.

" SECTION V (pp. 21-22).

"'Resistance to Filtration' Experiments.—The nature and amount of the suspended matters in the pre-filtration waters are of great interest and practical importance. Many of them are living and some give rise to taste troubles, and all of them exercise a greater or less influence on the task of filtration. It is comparatively easy in the laboratory by appropriate filtration experiments, combined with microscopical examination, to prophesy what is likely, or certain, to take place when a pre-filtration water is subjected to sand filtration on the Board's Works. It is true that it is not always deemed to be desirable to treat (e.g., with copper sulphate) a water showing the early signs of becoming badly affected and so averting filtration troubles, but an early intimation to the Engineering Department that things are not

altogether satisfactory may allow of certain measures being taken in advance so as to minimize as far as possible the trouble caused by the subsequent choking of the filters. Sometimes the choice between using two different waters for filtration purposes arises, and in such cases the laboratory 'findings' can usually be fully trusted to decide the issue. Detailed information on the subject is given in Section 5, but here it may be mentioned that the Chelsea and Walton stored waters give such satisfactory figures as 237 and 253, whereas the West Middlesex stored waters from Nos. 6, 3 and 4 reservoirs give such relatively unsatisfactory records as 116, 148 and 149 respectively. [Fig. 65.]

" SECTION VI (pp. 22-30).

" *Pre-filtration Waters.*—The systematic examination of all waters (over 20 in number) began a good many years ago, but last year a much more comprehensive study was started and will be continued indefinitely. Although it is a matter for legitimate regret that the sources of London's water supply are not above suspicion, it must always be remembered that *raw* river water is never used for filtration purposes. Either the water is chlorinated, or else stored for many weeks, and sometimes both these processes of purification are brought into operation. The net result is, as is fully explained in Section VI, that all the water previous to sand filtration has been brought into a condition of considerable, if not remarkable, purity. The great mass of pre-filtration water was improved at least ten times, a goodly proportion one hundred times, and a small amount of it actually one thousand times, as judged by the *B. coli* test. A finer eulogy of the precautions taken by the Board to safeguard the health of London could hardly be written.

" SECTION VII (pp. 30-38).

" *Rapid Filters.*—In this section an account is given of the small experimental plant at Staines and the permanent rapid filtration plant at Barn Elms. The results are full of promise, but a great deal of work remains to be done before reaching the position of being able to speak with assurance on the thorny subject of rapid filtration.

" SECTION VIII (pp. 39-41).

" *Gulls and Fish as Sources of the B. coli Contamination of Water.*—Although fish may play a part in the *B. coli* contamination of water, it is chiefly the gulls which visit the Board's works in great number during the winter that are to blame. The matter was specially investigated in connection with the West Middlesex Works, as the gulls seem to have a special predilection for this spot. Flying up the Thames Estuary, they appear to regard it as a haven of rest, and as there are plenty of fish doubtless they find it an excellent feeding ground. As each gramme (about 15 grains) of their 'droppings' may contain a million typical *B. coli*, it is obvious that their presence is the reverse of welcome. At the same time the writer wishes to make it quite clear that he does not regard the matter seriously from a health point of view. There is a wide distinction, in his opinion, between the intestinal discharges of man and those of birds and the lower animals. At the same time, as it is at present impossible to distinguish between the faecal bacteria of gulls and those derived from human beings, the presence of the former renders it extremely difficult to interpret

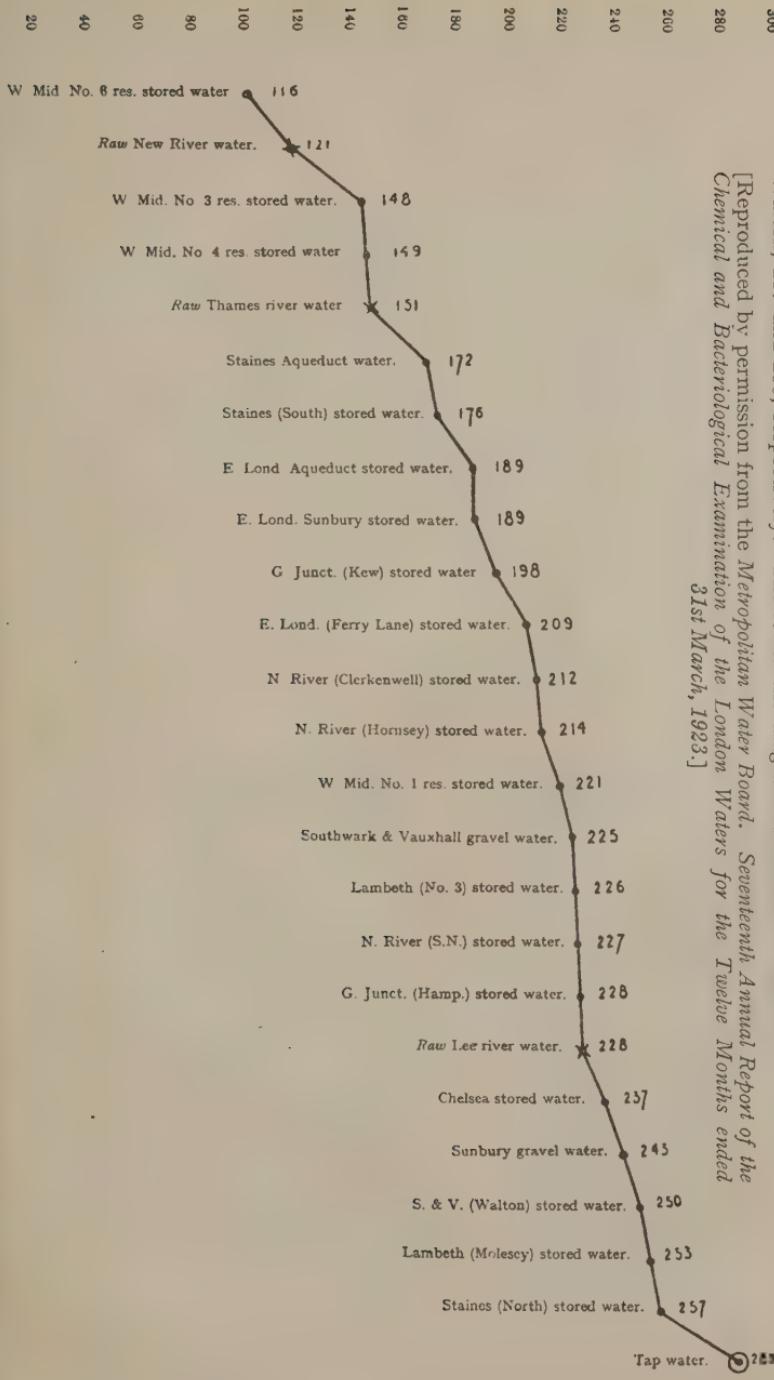


FIG. 65.—Shows the "resistance to filtration" results (i.e., number of cc. filtered per minute) of the examination of the pre-filtration waters (average 12 months ended March 31, 1923). Tap water (289) is taken as the criterion figure, as it represents a water containing practically no suspended matter. Only two and fivesamples of the Staines (North and South) reservoir water were examined respectively. All the other averages are based on the examination of multiple samples. It will be seen from the diagram that some of the stored waters yield excellent results, e.g., Chelsea and Walton, 237 and 250, respectively. The lower the diagram the worse the result.

[Reproduced by permission from the *Metropolitan Water Board. Seventeenth Annual Report of the Chemical and Bacteriological Examination of the London Waters for the Twelve Months ended 31st March, 1923.*]

correctly the significance of the bacterial results. For example, when *B. coli* are detected in the West Middlesex water during the winter it is impossible to tell whether their presence is produced by gull's excreta, in which case their significance is slight, or comes from human and therefore potentially dangerous sources.

"SECTION IX (pp. 41-60).

"*Bacteriophages*.—Bacteriophages are mysterious substances of recent discovery which have the amazing power, even in high dilutions, of killing and dissolving certain bacteria. Some regard them as ferments and others as possessed of living properties—certainly they are the most intriguing substances that have attracted the attention of bacteriologists for many years. It has always been a matter of regret to bacteriologists that they could not distinguish satisfactorily, if at all, between the *B. coli* of human origin and the *B. coli* derived from birds, fishes and the lower animals. In this investigation it was sought to discover if bacteriophages could be used for this purpose, but the results have proved disappointing on the lines of research so far carried out. Perhaps this might have been foreseen, inasmuch as bacteriophages in the past had not been found to be markedly specific in character, but, on the other hand, the mere fact that a bacteriophage may act in high dilution on some *B. coli* and have no apparent action in low dilution on others, implies a degree of specific action which might possibly have been turned to practical account. For example, if a large number of bacteriophages of human origin were prepared and tested separately against human and, say, cow *coli*, some might be found which acted upon more of the former than the latter. The mixture of these, it might be assumed, would be found useful in differentiating between the two kinds of *coli*. However, as has been said, the results, although extremely interesting as illustrating the behaviour of bacteriophages towards intestinal bacteria, failed to establish the points of differentiation so patiently sought for."

• • • • •

"*'Resistance to Filtration' and Microscopical Appearances of Pre-filtration Waters*.—All the pre-filtration waters, and the raw waters as well for comparative purposes, are tested for 'resistance of filtration,' by which is meant the degree to which the suspended matters (living and dead) in a water interfere with its filtration by blocking the filtering material. Although the sand filter is the real test in this connection, quite useful results may be obtained in the laboratory in the following way:—A piece of linen of superfine quality (96 meshes to the linear inch) is folded four times, moistened with water and tied round the end of a glass tube ($\frac{1}{4}$ in. diameter) by means of a rubber band. The tube is passed through a rubber bung, which is fitted into a filtering flask connected with a filter pump. The other projecting end of the glass tube has a piece of rubber tubing attached to it and into this is inserted the end of a pipette containing 100 cc. of the sample of water to be examined. The water passes through the linen into the flask, and practically all the suspended matter is retained on the inside of the linen. The rubber bung and glass tube are then detached and fitted on to the additional piece of apparatus.

"This is merely a convenient arrangement for supplying tap water under a constant head (about 5 ft.). The water is filtered through the linen, with its skin of suspended matter derived from 100 cc. of

the original water, for the space of one minute, and the filtrate is then measured.

"Passing next to the microscopical appearances, the following photographic method is used to give both a qualitative and quantitative picture of its nature:—

"Twenty cubic centimetres of the water are placed in a glass tube and centrifugalized, the result being that all matters in suspension are driven to the bottom of the tube. The contents are then carefully poured off to a little above the 0.2 cc. top mark on the narrower portion of the tube. The pipette is then used to suck out the water to exactly the level of the 0.2 cc. top mark, care being taken not to disturb the sediment. This water is expelled from the pipette, which is then used to mix thoroughly the deposit with the water remaining in the tube. Between the two marks is exactly 0.1 cc., and this amount, or one half of the whole of the suspended matter in 20 cc. of water, is transferred with the pipette to a small cell cemented on to a glass slide. A trace of formalin is added to prevent the movement of any motile organisms that may be present, and now we have 0.1 cc., or the suspended matter pertaining to 10 cc. of water, lying in the cell ready to be photographed."

Figures 66 to 75 represent the microscopical appearances of the suspended matters in 0.17 cc. of the waters named below (magnification of 50 diameters).

Some of the growths shown interfere seriously with filtration, e.g., *asterionella*, *fragilaria* and *cyclotella*. Others, like *ceratium*, do not seem to embarrass the work of filtration, at all events, to any marked extent.

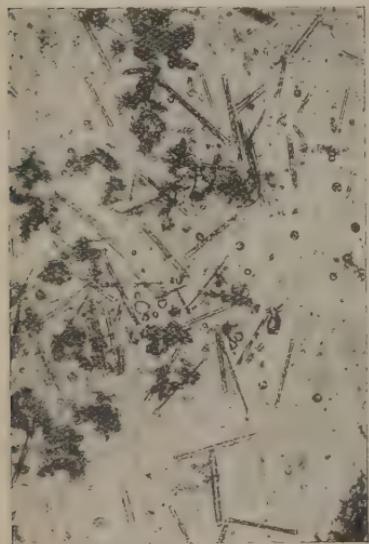


FIG. 66.—Shows very clearly the condition of the raw river waters about April and May, when diatoms (e.g., *synedra*) are apt to be specially abundant.



FIG. 67.—West Middlesex, No. 3, reservoir water, August 23, 1922. Chiefly *asterionella*.



FIG. 68.—Ferry Lane stored water (from the Walthamstow reservoirs), August 2, 1922. Fragilaria, asterionella and dinobryon.



FIG. 69.—Stained stored water (South reservoir), September 6, 1922. Chiefly ceratium.

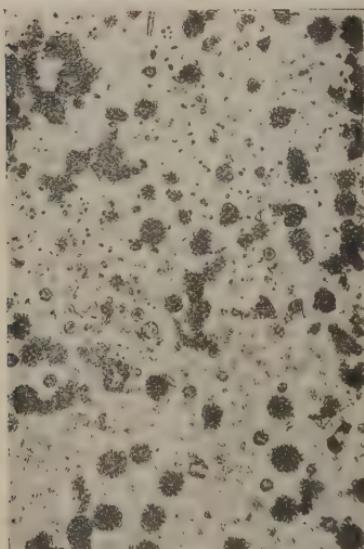


FIG. 70.—Southwark and Vauxhall gravel water, February 27, 1923. Chiefly synura. This photograph is interesting because it was this growth that gave rise, in 1922, to such serious taste troubles in New York.



FIG. 71.—West Middlesex, No. 4, reservoir water, August 30, 1922. Chiefly cyclotella with some fragilaria, etc.



FIG. 72.—East London Aqueduct stored water, July 12, 1922. Chiefly pandorina.



FIG. 73.—West Middlesex, No. 6, reservoir water, June 26, 1922. Chiefly fragilaria and asterionella with some pandorina.

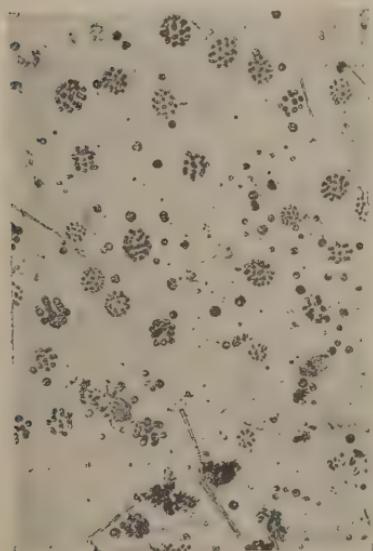


FIG. 74.—New River, Hornsey, stored water, May 15, 1922. Chiefly eudorina.



FIG. 75.—Sunbury stored water, April 18, 1922. Fragilaria, asterionella and numerous small cells.

ANDERSON (J. A.). **Purification of Drinking Water in the Field.**—
Jl. Roy. Army Med. Corps. 1923. June. Vol. 40. No. 6.
 pp. 401-422. With 17 text figs. [4 refs.]

The writer gives a useful review of the various methods used for purifying water on field service, of which many of our readers have had experience during the war. Details of the particular processes have been described many times over in the Sanitary Supplements. A figure is given of the water purification lorry, which some may not be familiar with [Figs. 76 & 77]. The writer is a strong advocate of the method of "clarifying by alum and sterilizing with chlorine." With this finding no one would disagree.

HITCHENS (A. Parker). **A Field Test for Determining the Potability of Water: a Method for performing the Presumptive Test for *Bacterium coli* without Special Laboratory Equipment.**—*Milit. Surgeon.* 1923. June. Vol. 52. No. 6. pp. 629-634. With 4 figs.

The writer suggests a method of testing the potability of water in places remote from laboratories, where much time must be occupied in bringing the sample to headquarters. A summary of his suggestions is given below.

Summary.

"To make the presumptive test for potability of water:—

"1. Take five 'presumptive test vials' and add to each approximately 10 cc. of the water to be examined, *i.e.*, up to the mark or scratch on the vials.

"2. Put the stopper back tightly, shake the vial, let the open end of the tube touch the side of the vial, and, turning it on its side, completely fill the inner tube with the water and broth.

"3. Turn the vial upright and loosen the stopper so that any gas formed during incubation may escape.

"4. When all five of the vials have been thus filled, place them in an incubator or water bath at 37° C., or in a dark place approximating as nearly as possible the temperature of the body.

"5. After twenty-four hours incubation, examine the five vials and note whether or not there has been gas formation; if there has been, record the amount in each of the five vials. There will practically always be a tiny bubble of air in the top of the tube, due to separation of a part of the dissolved oxygen from the water during incubation; if there is not more, therefore, than a small bubble, this will be ignored.

"6. The vials will be examined again after forty-eight hours incubation, noting gas formation as at the twenty-fourth hour examination.

"7. If there is no gas formation—or less than 10 per cent.—in any of the five tubes, the water is *potable* and further examination of the sample is unnecessary.

"8. If there is 10 per cent. of gas or more in *only one* of the five tubes, the water is *potable* and further bacteriological examination of the sample is unnecessary.

"9. If there is 10 per cent. or more of gas in *two or more* of the tubes, further bacteriological examination is required to learn whether or not the water is potable, and meanwhile it should be chlorinated or iodized in order that there may be no doubt as to its safety for drinking.

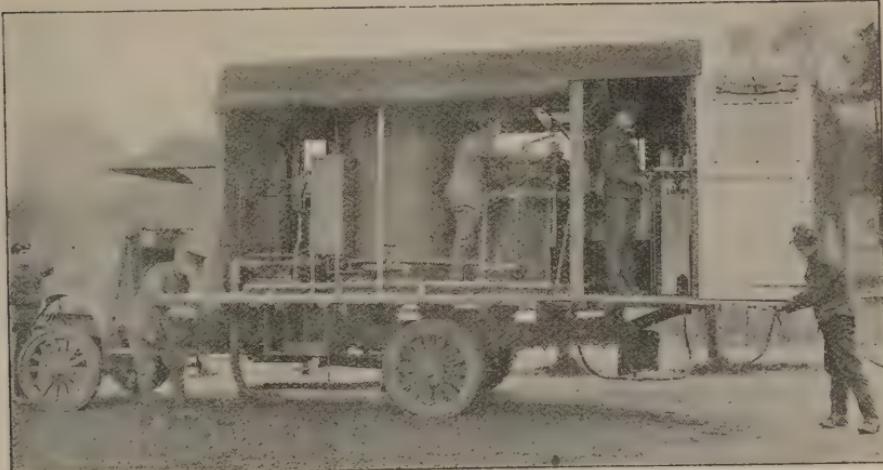


FIG. 76.—Type of Motor Lorry Water Sterilizer with chlorine gas plant.
Normal output 1,200 gallons per hour.

DIAGRAM OF WATER PURIFICATION PLANT
ON LORRIES

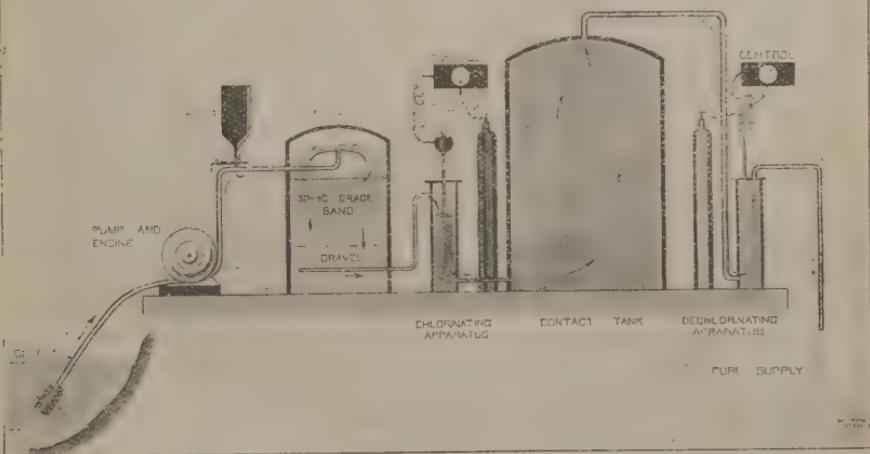


FIG. 77.—Details of Purification Plant. The water is pumped up by a small petrol-driven motor to a sand filter, being dosed with alum solution *en route*. From the sand filter the clarified water passes through a small cylindrical chlorinating chamber where, by means of a diffuser, the chlorine gas reaches the water in minute bubbles so that complete and immediate solution results. After chlorination the water passes to a large closed tank of such a size as to ensure an average period of contact sufficient for sterilization. From this contact tank it passes to a second small cylindrical chamber, where it is dechlorinated by gaseous sulphur dioxide, prior to issue for consumption.

[Reproduced by permission from the *Journal of the Royal Army Medical Corps.*]

" 10. Should an incubator at 37° C. not be available and should it be impossible to improvise one, holding the tubes at living-room temperature for not more than three days will be at least equivalent to forty-eight hours in the incubator."

We cannot recommend the method nor do we agree with some of the statements made. In rural water-supplies careful inspection will often tell an experienced officer a great deal. Consequently we consider that it is better to be content with an inspection and when in doubt as to the purity of the water to sterilize it with chlorine.

This is better from a health point of view than a doubtful bacteriological analysis.

STILES (C. W.) & CROHURST (Harry R.). **The Principles underlying the Movement of *Bacillus coli* in Ground-Water, with resulting Pollution of Wells.**—*Public Health Rep.* 1923. June 15. Vol. 38. No. 24. pp. 1350-1353.

A very elaborate series of tests has been made for direct pollution of subsoil water generally, *B. coli* being used as a test for bacteria and uranin for a colouring matter. The conclusions, which are of considerable importance in the tropics where wells are largely used, are given below.

" 1. Pollution with faecal *Bacillus coli* has up to date been definitely and progressively followed in the ground-water for distances of 3, 6, 10, 15, 25, 35, 45, 50, 55, 60 and 65 ft. from the trench in which the pollution was placed; uranin has been recovered from these same wells and has spread to other wells at 70, 75, 80, 85, 90, 95, 100, 110 and 115 ft. from the pollution trench. The soil in question is a fine sand with an effective size of 0.13 mm.

" 2. The pollution has travelled these distances within a period of 187 days, or about 27 weeks, and only in the direction of the flow of the ground-water; no convincing evidence is present that the pollution has travelled against the flow of the ground-water or at right angles to it.

" 3. The pollution has travelled only in a thin sheet at the surface of the zone of saturation; there is no evidence at present that it has dispersed radially downward, and even when heavy pollution is recovered at the top, water from lower levels (in nearby deeper wells) is negative both for uranin and for *B. coli*.

" 4. As the ground-water level falls, owing to dry weather, the pollution tends to remain in the sand above the new (lower) ground-water level, namely, in the new capillary fringe.

" 5. There is no evidence which would justify a conclusion at present that either the bacteria or the uranin is carried or moves to any appreciable distance in the capillary fringe itself, and there is neither theoretical reason nor experimental evidence to justify a conclusion that either the bacteria or the uranin progresses in the dry aerated intermediate belt (between the capillary fringe and the upper soil belt). All present evidence is to the effect that when the ground-water level falls the pollution remains practically stranded in the capillary fringe or in the intermediate belt—according to the degree of fall of the ground-water.

" 6. A rainfall of 1 in. results in a rise of 5-6 in. in the ground-water table (in the particular experimental area in question); and if this

rise is sufficient to re-establish the zone of saturation up at the level of the stranded pollution, the bacteria and the uranin are again picked up and carried along farther in the direction of the ground-water flow until dry weather again intervenes to cause another fall of the ground-water level.

" 7. Thus the progressive (passive) movement and the stasis (stranding) of the pollution are intimately connected with, are dependent upon, and alternate with the rise and the fall of the ground-water level, and this latter factor is dependent upon the alternation of wet weather (rainfall) and dry weather (lack of rain at the intake area of the ground-water table). Experiments are now under way to determine, if possible, whether pollution placed directly into a deeper level of the ground-water will travel up to the surface of the saturated zone.

" 8. In explaining these results, capillarity, filtration, and gravity seem to come up for special consideration.

" 9. In one experiment the pollution travelled only 45 ft. from September, 1922, to May, 1923, and remained stranded at this distance. Study of the formation of the ground revealed that under the belt of pollution there is an impervious or nearly impervious stratum of peatlike material which gradually tilts upward distally from the pollution pit and forms a ground-water dam ; the pollution travelled out on high ground-water to the dam, the ground-water level fell below the crest of the dam, and the pollution is now stranded, pending a rise of the ground-water table sufficient to produce a ground-water cascade which will carry the pollution over the crest of the dam.

" 10. The ultimate distance to which the pollution will be carried is dependent upon a number of complex and interlocking factors, namely, wet and dry weather, with resulting rise and fall of the ground-water ; the length of each of these periods ; the rate of the ground-water flow (depending upon the 'head,' which, in turn, is dependent upon the rainfall) ; and, obviously, also the factor of the viability of the organisms under conditions of moisture, pH, food supply, etc., *ad finem*.

" 11. In another series of experiments human faeces were buried in pits in a locality of high ground-water and covered with sawdust. Of five samples taken three years and two months after burial, all were both macroscopically and microscopically recognizable as faeces, but the odour had become somewhat musty ; three of these samples were positive and two were negative for *B. coli* ; ova of *Ascaris lumbricoides* were recognizable in all five samples, but all 57 ova found were dead.

" 12. The bearing of the foregoing results upon the intermittent pollution of wells, the location of water supplies, and the location of camps in peace or in war, will be evident to persons who are called upon for technical advice in these matters ; the justification of the laws forbidding the use of abandoned wells for the disposal of excreta is self-evident ; the possible effect of the cutsom (in some localities) of digging pits into ground-water (as advised by some persons) is obvious.

" 13. In protecting wells special attention should be given not only to surface protection, as is now generally recognized, but also to a new element, namely, the danger zone which exists from the highest water level to about a foot below the lowest water level. A leak in the pipe in this region is potentially very dangerous and all wells unprotected in this danger zone are to be considered as potentially unsafe."

HAVENS (Leon C.) & DEHLER (Sophie A.). **The Effect of *Gambusia affinis* on the *B. coli* Index of Pollution of Water.**—*Amer. Jl. Hyg.* Baltimore. 1923. May. Vol. 3. No. 3. pp. 296-299.

This brief paper is of very considerable importance to sanitarians, and to water analysts in particular. The writers have studied the intestinal flora of *Gambusia*, the small "minnow" employed for destroying larvae in water supplies. They find that the bacteria in the intestine of these fish are *B. pyocyaneus* and another unidentified spore bearer, but not *B. coli*. Under experimental conditions *B. coli* and *B. pyocyaneus* will not thrive together, the *B. pyocyaneus* overgrowing and removing the *coli*.

From these conclusions it is obvious that in a water supply to which *Gambusia* have been added *coli* may disappear altogether; consequently the presence of *coli* cannot be used as an indication of pollution, for if it were a drinking water it might very easily be passed as of good quality when in reality it contained dangerous disease-bearing bacteria.

These results should be confirmed from different parts of the world before they are generally accepted, as we have found that the intestinal flora of the ordinary frog varies very considerably in different countries from causes which are entirely unknown at present; possibly the same may apply to fish.

THERIAULT (Emery J.) & CLARK (W. Mansfield). **An Experimental Study of the Relation of Hydrogen Ion Concentrations to the Formation of Floc in Alum Solutions.**—*Public Health Rep.* 1923. Feb. 2. Vol. 38. No. 5. pp. 181-198. With 6 figs. [7 refs.]

COHEN (Barnett). **Indicators for pH Control of Alum Dosage.**—*Public Health Rep.* 1923. Apr. 6. Vol. 38. No. 14. pp. 739-740.

i. This is a highly technical paper, of which persons interested should obtain copies.

"The outstanding features of the results of this study are as follows:—

"The hydrogen ion concentration of the final mixture of water and alum is of fundamental importance in the formation of floc. When other possible factors are left out of consideration, optimum conditions for floc formation will be found with a narrow zone of pH centred for dilute solutions at pH 5.5. The more dilute the water in total salt content and the less the alum added, the narrower becomes the pH zone with which optimum floc formation is to be found. Consequently, precise pH control should in favourable cases permit of great economy in alum dosage."

ii. Barnett Cohen gives some important advice on the subject of indicators of the pH range of about 5.5.

"Let it be assumed that a mixture of alum and water is to be adjusted to pH 5.5. The colour changes of the indicators would then be as follows:—

Indicator.	4.5	5.0	5.5	6.0	6.5
Methyl red . . .	Red	Red	Orange	Yellow	Yellow
Brom. cresol green . . .	Yellow	Green	Blue	Blue	Blue
Brom. phenol red . . .	Yellow	Yellow	Yellow	Orange	Red
Brom. thymol blue . . .	Yellow	Yellow	Yellow	Yellow	Green

"The colours to be expected when the mixture is too acid or too alkaline to the extent of 0.5 and 1.0 pH units are shown in the table. Other useful combinations may be readily invented after a study of the neutralization curves or apparent dissociation constants of the various indicators. It lies with the operator to determine the indicators best adapted to his special uses."

FREDERICK (Robert C.). **An Abnormality found in Water Analysis.**—

Reprinted from *The Analyst*. 1923. Feb. 1 p.

"As the writer is not aware of any previous mention of the point in chemical literature, it may be worth while to make brief record of an abnormality which has been encountered in water examination on two occasions and in samples of totally different origin.

"In the first case the sample concerned was a peaty water from a small loch in the Orkney Islands, and in the second a water from a well, 11 ft. deep, in Co. Kerry. The former sample was of satisfactory quality for drinking purposes; the latter gave some evidence of excretal pollution, was 'dirty,' and frothed on shaking.

"The abnormality was most marked in the second case, and . . . [the departure from the normal] was found in the estimation of albuminoid ammonia by Wanklyn's process. After the free ammonia had been estimated in the usual manner, it was found that, on addition of alkaline permanganate for the albuminoid ammonia estimation, the permanganate was almost completely reduced, and the distillate fractions gave such a marked yellowish-white precipitate on addition of Nessler's reagent that even approximate estimation of the albuminoid ammonia was impossible. In this connection it is interesting to note that BOUGAULT and GROS (*Analyst*, 1922, 47, 405) have recently shown that such a precipitate is given by certain ketones."

CONSERVANCY.

GAUNT (Percy). **Sewage Disposal in Shanghai.**—*Surveyor & Municipal & County Engineer*. 1923. Aug. 10. Vol. 64. No. 1647. p. 100.

The equipment of the laboratory was completed in July. Two thousand samples of effluents from the various treatment plants and of water from those creeks, the character of which most closely affects the problem of water supply, have been examined.

During the continuance of measures for the treatment of stale cesspool contents, the general character of the sewage will be such as to cause temporarily some difficulty in maintaining the highest standard of purification. The rigorous exclusion of all surface water results, as was to be anticipated, in sewage of a concentration quite outside the range of British or American practice. Certain difficulties in the treatment of cesspool contents arise not so much from the concentration as from the staleness and from extremes of temperature, resulting from the present methods of collection.

The Kinneir-road continuous flow plant, dealing with fresh sewage from a population of over 300, has continued to yield uniformly satisfactory results. The relatively stagnant creek into which the effluent discharges remains clear and without visible deterioration. There is an entire absence of nuisance in the neighbourhood of the plant from smell or insect life. Average daily samples of the effluent show that it contains less than 2 parts per 100,000 of suspended matter, and with its suspended matters included does not take up at 23° C. more

than 1 part per 100,000 of dissolved oxygen in five days. Bacteriological examinations of the effluent have shown a reduction of more than 98 per cent. in comparison with typical sewage.

SURVEYOR AND MUNICIPAL AND COUNTY ENGINEER. 1923. July 27.
Vol. 74. No. 1645. pp. 67-68. With 2 figs.—**Sewage Disposal at Birmingham. Recent Developments.**

" In view of the fact that the Drainage Board's district increases year by year, and that it is necessary to build an acre of bacteria beds per annum to keep pace with the increasing volume of sewage, the Board deemed it necessary to put down an activated sludge, or bio-aération experimental station."

" Three plants, each capable of dealing with 10,000 gallons of sewage per day, were constructed : (1) Activated sludge, by air blowing, advocated by the Manchester school ; (2) bio-aération, by agitation, advocated by the Sheffield school ; and (3) percolating filters, composed of gravel, built on generally approved methods. The latter were subdivided into three sections of different depth, each possessing the same cubic capacity. These experiments have been in the charge of the Board's chemist, and they have led to the establishment of the following important facts :—

" (1) That the Birmingham sewage is amenable to treatment either by the airblowing or the agitation method.

" (2) That a tank liquor forms a better subject for purification than crude sewage.

" (3) That efficient flocculation of tank liquor for one hour removes 60 per cent. of its impurity.

" (4) That flocculation of tank liquor for one hour removes all objectionable smell.

" (5) That flocculation of tank liquor for one hour produces a liquor which may be oxidized at more than double the present rate on a percolating filter.

" Each one of these points is of great importance. The first may be of purely local value, but seeing that the Birmingham sewage absorbs 26 parts of oxygen per 100,000 as against 10 or 12 parts per 100,000 at Manchester, and rather less at Sheffield, it is of more than local importance to prove that a sewage containing trades' waste which absorbs so much oxygen is amenable to activated sludge or bio-aération treatment.

" It is impossible in the Birmingham district to boat sludge out to sea as in London, Glasgow and Manchester, but it is dealt with quite as effectively by a process of digestion which renders it odourless, frees it from grease, conserves its nitrogen and still leaves it available to the farmer. Further, there is no object in carrying forward more sludge to the bio-aération plant than is absolutely essential to provide the medium of nidus on which healthy organisms are cultivated, and the Birmingham experiments show that 8 parts per 100,000 of suspended visible solids, plus 10 parts of colloidal sludge, are sufficient for this purpose.

" The removal of 60 per cent. of the impurities in the sewage in the first hour of the aération process is of great moment. The removal of colloidal matter to a large extent and the riddance within an hour of smell are matters for congratulation, and the Board is also attracted by the benefits specified under (5) when it is shown that flocculated sewage which has been deprived of colloidal matter is much more readily oxidized, and consequently existing bacteria beds will be

rendered capable of treating efficiently considerably more than double the volume of sewage hitherto applied to them. The bacteria beds will thus be relieved of work for which they are not well fitted. They are, no doubt, capable of dealing with humus which arises from the particulation of colloidal matter, provided sufficient time and favourable conditions are given, but it is not profitable to keep them employed on work for which they are not well fitted."

SMALLPOX VACCINATION.

MADRAS. *Reports on the Working of the King Institute of Preventive Medicine, Guindy, for the Official Year 1921-22 and the Micro-Biological Section for the Period from 1st January to 31st March, 1921.* [CUNNINGHAM (J.), I.M.S., Director.]—pp. 30 + 3. With 2 charts. 1923. Madras : Supt., Govt. Press. [Price 10 annas.]

The report deals with the large amount of what may be termed domestic matters concerning vaccination in the Province of Madras. It has, however, been clearly shown that the new glycerinated lymph is superior to the older lanolinated, even when used in the districts. The results from lanolinated lymph in 1922 are very considerably superior to those of 1920 and 1921, this is probably due to the better quality of the pulp obtained. The average yield of pulp per calf has increased from 14.6 gm. to 20.2 gm. Figures are available which show that although the actual number of operations has decreased owing to vaccination having been stopped for four months during the hot weather, in accordance with orders of Government, yet with the improvement in the quality of the work throughout the Province the amount of protection afforded is slightly greater by reason of the better results obtained on the individual.

PADUA (Regino G.). *Efficacy of Antivariolar Vaccination in the Philippines during 1921 and 1922.*—*Jl. Amer. Med. Assoc.* 1923. May 12. Vol. 80. No. 19. pp. 1361-1364. [2 refs.]

Conclusions.

"Interpreting the statistical results, it is firmly believed that protection of the public is afforded by systematic and successful antivariolar vaccination. There are no other factors to which the eradication of smallpox in Manila and the rapid reduction of the morbidity and mortality rates in the provinces during 1921 and 1922 may be chiefly ascribed. . . .

"In general the specific morbidity and mortality rates of smallpox among the vaccinated have been the lowest in infected provinces in which the percentages of immunized population have been the highest, and conversely. On the other hand, all things being equal, the specific rates of the unvaccinated have been high in infected localities in which the percentages of immunized population have been low, and conversely also. Rare exceptions to this were due to the large number of susceptible children who became subsequently attacked with a more virulent strain that could not be overcome by the vaccination immunity, and those who, because of religious and various other causes, escaped vaccination.

"On the whole, 61 per cent. of the cases during 1921 occurred among children, a great proportion of which were never vaccinated, or were unsuccessfully vaccinated. The problem, therefore, fundamentally centralized in the compulsory vaccination of children, such as is now

being practiced to include infants of even 1 month old or under. And it is hoped that with subsequent modification of the vaccine virus to resist deterioration in hot weather, the actual endemic occurrence of the disease, in certain sections of the islands, will be completely done away with."

BRANCH (E. Wm. R.) & McDONALD (W. M.). **A Discourse on the Outbreak of Alastrim in Antigua, B.W.I.**—*Jl. Trop. Med. & Hyg.* 1923. June 15. Vol. 26. No. 12. pp. 214-217.

The writers give an interesting account of an outbreak of alastrim in Antigua. From this account one would rather incline to the opinion that it was an ordinary outbreak of rather mild smallpox, but for the following tabulation of what the writers consider to be the difference between the two diseases.

Smallpox.	Alastrim.	Chickenpox.
Attacks children and adults.	Mainly attacks adults.	Supposed to be a disease of childhood, but many of the cases here are adults.
<i>Incubation.</i> —Almost invariably 12 days. <i>Prodromal Illness.</i> —Usually severe. <i>Eruption.</i> —Fully out in 36 to 48 hours.	<i>Incubation.</i> —12 to 17 days, or even 21 days. <i>Prodromal Illness.</i> —Very slight. <i>Eruption.</i> —Comes out usually in successive crops over period of 10 days.	<i>Incubation.</i> —10 to 19 days. <i>Prodromal Illness.</i> —Generally absent. <i>Eruption.</i> —Comes out in successive crops over period up to 5 days.
<i>Vesicles.</i> —Not fully formed until 3rd or 4th day; induration of base umbilicated; multilocular; do not collapse when pricked.	<i>Vesicles.</i> —Mature irregularly; dome-shaped; uniform size; unilocular; not umbilicated; covering layer of epithelium thick; collapse when pricked.	<i>Vesicles.</i> —Fully developed; all stages seen; irregular shape and size; thin-walled; flat, not dome-shaped; superficial; collapse readily when pricked.
<i>Distribution.</i> —Specially copious on face and extremities.	<i>Distribution.</i> —Similar to smallpox.	<i>Distribution.</i> —Eruption far more copious on trunk (chest and back); then thighs and upper arms; very few on extremities and face; palms sometimes affected.
<i>Mortality.</i> —Varies, may be 25 per cent. <i>Vaccination.</i> —Protects.	<i>Mortality.</i> —None of our cases died. <i>Vaccination.</i> —Protects. All our cases, with one exception, had never been vaccinated. The exception was a man of about 40, who had been vaccinated in infancy and he developed a very mild and modified case of alastrim.	<i>Vaccination.</i> —Does not protect.

It is significant also to notice that the remedial measures, which consisted in thorough vaccination of the population, were entirely satisfactory. No less than 28,000 people were operated on within a very short time.

DISINFECTION.

CHIARA (Leonardo). *Les opérations de désinfection effectuées en 1922 dans les ports d'Alexandrie, de Suez et de Port-Said en 1922.*—*Bull. Office Internat. d'Hyg. Publique.* 1923. May. Vol. 15. No. 5. pp. 619-640. [1 ref.]

This paper is practically a report for the year 1922 of the work done by the Marine Quarantine Department in Egypt, particularly that of disinfecting ships.

In the three principal ports of Suez, Port Said and Alexandria, 4,649 steamers and 1,500 sailing ships were disinfected. The figures are also given for the three towns. The usual method of cleansing ships is swilling them with crude carbolic acid in an alkaline mixture of potassium and soda. Steam sterilizers were used for the disinfection of the clothing of the crew and passengers, as well as lysol. There is a very large pilgrim traffic to and from Egypt, and the clothes of a large number of hajees have to be rendered free from insects. In order to insure that the steam has penetrated, small tubes of various substances are folded in the interior of the bundles, such as antipyrine, melting at 112°, acetanilide at 114°-115°, resin at 117°, benzoic acid at 120°. For cabins formaldehyde gas is used entirely, 5 gm. per cubic metre of space.

During the current year 71 ships and 20 sailing vessels were treated for rats; 711 rodents were killed, chiefly by Clayton gas.

The writer has already expressed an opinion as to the use of hydrocyanic acid gas, *vide Review of Hygiene*, No. 8, August, 1922. He considers that it should only be used in cases where circumstances absolutely demand it, and that it has many disadvantages in a country like Egypt.

Patients that have to be disinfected are removed by train to a station, where their clothes are taken from them and a hot bath administered. A special soap called "mazoap" has been made use of for this purpose. It consists of a stiff emulsion of kerosene oil, potash soap and distillate oil, will lather in both hot and cold water, and has a very rapid action on fleas and bugs. The emulsion was first made by Dr. FORBES, who is in charge of the department. Plenty of hot water and cyllin or other disinfectants are available for the pilgrims. Women's clothes, which it may be undesirable to put into the steam sterilizer, are rendered free from insects by treatment with SO₂ gas.

DUNN (Lawrence H.). *Observations on the Use of a Steam Jet for Delousing Railway Coaches.*—*Milit. Surgeon.* 1923. July. Vol. 53. No. 1. pp. 42-44.

The writer describes how he dealt with railway carriages infested with bugs and lice during the war. His improvised arrangement consisted of a steam boiler working at a pressure of 125 lb., provided

with a flexible steam-pipe and a series of nozzles. The nozzle was applied close to the woodwork and cushions of the carriages. Lice exposed to the blast of steam for a few seconds close to the nozzle were killed, but at a distance of 2 ft. none were killed and at a distance of 1 ft. for 30 seconds only 25 per cent. were killed. The writer remarks that the method is not likely to have a wide application, as it is somewhat uncertain.

KUHN (Harry A.). **Fumigation of Washington Barracks and Army War College by the Chemical Warfare Service.**—*Jl. Econom. Entom.* 1923. June. Vol. 16. No. 3. pp. 323-326.

The writer points out that as a result of chemical warfare a good deal of knowledge has been acquired on the use of cyanogen and its derivatives, and has been applied to rendering buildings and ships free from rats, bugs, cockroaches, etc. The present paper describes an experiment with an even more effective gas on a large barrack establishment infested with bugs and cockroaches. For after some little experimental work it was found that although a lachrymator could be very readily released with hydrocyanic acid, the lachrymator persisted after the cyanide had been dispersed. Search was therefore made for a substitute for hydrocyanic acid, which should be just as toxic to vermin, should either have a powerful odour or be a lachrymator, in order to be as easily detected, which should also be as readily generated *in situ*, and should also be very volatile and as readily dispersed from a ship's hold. After considerable experimentation, the Public Health Service cyanogen chloride, generated by dropping the desired amount of granulated sodium cyanide and sodium chlorate into dilute hydrochloric acid, was selected as possessing all the necessary qualities. Cyanogen chloride is almost as toxic to insects and vermin as hydrocyanic acid, besides being a vigorous lachrymator. It was found also to be a very good germicide, which hydrocyanic acid is not. Cyanogen chloride, thus generated, proved effective in ridding various buildings at Edgewood Arsenal of rats, mice, bats, roaches and bed bugs; it has also been attested by the Public Health Service against other sorts of vermin and against germs, both in the laboratories and on board ship, and it will soon be used by that Service for all ship fumigation.

The cubic contents of the various barrack buildings of the experiment here described ranged from 20,000 to 200,000 c. ft. The maximum concentration—6 oz. of sodium cyanide to 3 oz. of sodium chlorate per 1,000 c. ft.—was used in the quartermaster's office, mess halls and the non-commissioned officers' quarters, but for all the officers' quarters the sodium chlorate was reduced to 1½ oz. with 6 oz. sodium cyanide per 1,000 c. ft. The gas was generated by dropping bags (made of two thicknesses of cheese-cloth) containing the 6 oz. sodium cyanide crushed to about the size of a bean, mixed with the stated amounts of granulated sodium chlorate, into a 3-gallon crock containing 1,500 cc. commercial hydrochloric acid, diluted with an equal quantity of cold water. The exposure allowed was 2 hours; non-commissioned officers' quarters 3 hours. It was found that bed bugs required a longer time of exposure than cockroaches. Casualties of all insects, rats and mice was practically 100 per cent. There was no evidence of corrosion of metal or injury to fabrics.

PUBLIC HEALTH REPORTS. 1923. July 6. Vol. 38. No. 27. pp. 1531-1533.—Ventilation of Ships after Fumigation with Poisonous Gases.

We have already referred to the experiments on the ship "Hartford" in the use of gas fumigants. The writer of this report deals with the subject of ventilation after fumigation. He points out that pockets of gas lie mainly on the weather side and not as would be supposed on the leeward side of the ship. It is desirable that the ventilation cowl should be arranged as follows: those on the weather side should face away from the wind, and the horizontal axes of their cowls should coincide as nearly as possible with the direction of the wind, being adjusted as the wind or the position of the ship changes; ventilators on the lee side should open towards the wind. Ships carrying perishable cargo, such as fruit, invariably adopt this arrangement at sea.

The second point noticed is that the use of bilge pumps frequently accelerates the dissipation of poisonous fumes. The removal of bilge water starts currents of air, and a captain has been known to keep his bilge pumps running, sucking air and not water, in order to produce this effect.

INDUSTRIAL HYGIENE.

NETTO (José Ribeiro de Oliveira). *Prophylaxia das causas directas de insalubridade das fabricas de fiar, tecer e tingir o algodão. Commentarios a situação das fabricas paulistas em face destas causas.* [Prevention of Ill-health in the Cotton Industries of S. Paulo.]—*Bol. Soc. Med. e Cirurg. de S. Paulo.* Brasil. 1922. Dec.; & 1923. Jan. & Feb. Vol. 5. 3rd Ser. Nos. 10, 11 & 12. pp. 181-190. With 2 plates. [11 refs.]

This contribution reveals a sad state of things in the cotton works of S. Paulo. The buildings are small, badly constructed, ill-ventilated, dark, overcrowded; the atmosphere heated, moist, contaminated by cotton particles, irritating vapours, poisons in the dyes. The work is arduous, much of it is done at night, many women and even children are employed.

The question of ill-health is dealt with as it is likely to arise at each step of the process from the raw to the finished product—the initial cleaning of the fibre, the spinning of the thread, dyeing the finished thread, the raw fibre or the woven piece, the weaving and ironing, the printing and bleaching, the mangling and pressing in a steamy atmosphere, the drying and packing.

Ventilation is mainly natural; artificial ventilation is practically restricted to attempts at dust extraction. The heat and moisture cause attacks of convulsions and heat-stroke in some, while the majority suffer from fatigue, debility and anaemia. The "Vortex" system is recommended, an apparatus for automatically regulating the humidity by conducting and spraying cold and filtered water into the air of the room. The air is not only impregnated with the dust of the fabric, but with gases and particles of chemicals used in dyeing and other processes—sulphurous, sulphuric, chromic, oxalic,

nitric, and even hydrocyanic acid in small amounts. These give rise to headache, vomiting, palpitation, joint pains, and definite local conditions, such as eczema and ulceration, blepharitis and conjunctivitis, laryngitis, bronchitis, and "cotton pneumonia." It is suggested that overalls and masks should be provided, that the drums of dye should be emptied as soon as the operation is over, that much of the handling of materials should be replaced by machines.

Apart from these conditions the general arrangements are bad; the drinking water is not above suspicion, no cups are provided and most of the employees drink directly from the taps; the latrines are insufficient and very foul; spitting on the floors is universal. "Shuttle-kissing" is common, with its dangers of tuberculosis and syphilis.

The author quotes the legislative measures in force in other countries—England, France, Germany, Italy, Austria—and has evidently taken great trouble in preparing a most interesting and instructive paper.*

CURJEL (Dagmar F.) [M.D. Glasg., Women's Medical Service, India.]
Women's Labour in Bengal Industries.—*Bulletins of Indian Industries and Labour.* Calcutta. 1923. June. No. 31. 40 pp.

A descriptive account of the circumstances and conditions of female labour in the jute and cotton mills near Calcutta, in the tea gardens of the Dooars and the Darjeeling area, and in the Raniganj coal mines.

The paper contains much interesting matter, but the arrangement of the subject is defective and it is very difficult for the reader to ascertain what remedial measures the writer suggests.

REPORTS AND VITAL STATISTICS.

UNITED FRUIT COMPANY. Medical Department Eleventh Annual Report, 1922. [DEEKS (William E.), General Manager.]—147 pp. With 13 figs. 1923. Boston, Massachusetts.

Annual medical reports of business concerns are nearly always important; that of the United Fruit Company is certainly the most interesting we have received. The company operates in a large number of centres in the tropics.

The medical department costs 2.62 per cent. of the total amount expended. The company being a large one this percentage represents a very substantial amount.

Malaria forms 40 per cent. of the cases admitted to hospital and 14 per cent. of the deaths. Amoebic dysentery, 202 cases, 127 of which occurred in the Colombia division. The cause assigned is the impossibility of controlling the drinking supply in this place, where irrigation is usual. Three hundred and twenty-nine cases of bacillary dysentery, 293 of which were treated, occurred in the Truxillo division, and were due to the consumption of unsuitable food, principally crabs.

Out of 202,341 blood examinations, 47,601, or 23.53 per cent., showed malaria. There was a slight outbreak of yellow fever in British Honduras, which was easily put down. The company thinks that probably 70 and 90 per cent. of the native untreated population harbour hookworms; treatment by carbon tetrachloride has been commenced.

* Summarized by Dr. H. Harold Scott.



FIG. 78.—Quarters for white nurses on the United Fruit Company's Hospital Grounds at Banes, Cuba. (Front view.)



FIG. 79.—Standard overseer's house of the United Fruit Company, showing the surrounding grounds cleared for sanitary reasons.

[Reproduced from the *United Fruit Company Medical Department Eleventh Annual Report, 1922.*]

The company's typhoid mortality rate is 27.09 per cent., which is almost the same as in the Canal Zone. Great care is taken with the sanitation of the company's ships; 2,510 voyages were made this year in the carriage of nearly half a million passengers. During the whole nine years that the company has been operating they have only had four instances of quarantinable diseases, two of these being yellow fever and two alastrim.

It is a great pity that English companies who have millions invested in the tropics do not take up prevention of disease on the same lines as is done by the United Fruit Company.



FIG. 80.—Typical screened field dispensary of the United Fruit Company in outlying districts served by coloured dispensers.

[Reproduced from the *United Fruit Company Medical Department Eleventh Annual Report, 1922.*]

ASSAM. Annual Public Health Report of the Province of Assam for the Year 1922. [YOUNG (T. C. McCombie), Director of Public Health.]—pp. 38 + 3. 1923. Shillong: Assam Govt. Press. [Price 12 annas = 1s. 6d.]

"A successful piece of work in the sphere of school hygiene may be recorded. Major E. J. C. Macdonald, I.M.S., who is Medical Officer of [the Shillong] schools, at the beginning of the school term, performed the Schick test on 247 children and 6 adult teachers. A positive reaction was observed in 121 children and 4 adults. In the largest school, which contained 125 boarders and 14 day scholars, all were tested but one boy, and out of 57 who gave a positive Schick reaction 56 were immunized. The 57th boy developed diphtheria before he had been immunized, as his parents objected to the operation, and he

made a satisfactory recovery. At a later date a boy who had given a negative Schick test developed a very mild attack of sore throat and non-virulent diphtheria organisms were identified in the swab. It is considered that this case may either have been one of septic sore throat in a healthy contact carrier, or modified diphtheria in an immune subject. After recovery non-virulent diphtheria bacilli persisted in his throat and resisted all attempts at sterilization for some months afterwards. He was therefore present throughout the season as a 'carrier,' despite which only one other case of diphtheria occurred, by a curious coincidence in the person of the one boarder who by oversight had not been tested by the Schick test. He also made a good recovery. No cases of diphtheria occurred in the other two schools. Thus out of 247 children and 6 adults who were at risk, there were three cases of diphtheria during the term, *viz.* :—

"(1) A case of clinical diphtheria in an unimmunized Schick positive case.

"(2) A case of mild sore throat of doubtful nature in a Schick negative case.

"(3) A case of clinical diphtheria in an unimmunized scholar whose Schick reaction is unknown.

"In so far as is known, this is the first attempt to make use of the Schick reaction and toxin antitoxin immunization in India. The biological and clinical evidence seems to prove that the toxin for the Schick tests and the toxin antitoxin immunizing mixture can, although not always, retain its potency after a journey to India during the hot weather months and give similarly useful results in India to those reported in Europe."

An account of the *kala azar* campaign in Assam is again a very interesting feature of this report. The number of cases treated in 1920 was 7,188; in 1921, 15,880; and in 1922, 19,659; the recorded mortality in 1922 is less than in either of the two preceding years. The statistical inferences are "that, except in Sylhet, comparatively few *kala azar* cases are escaping treatment and that the net work of treatment organization with which the infected areas have been covered is proving effective. The significance of [the] figures can perhaps be more graphically demonstrated by a reminder what the death-rate would have been amongst twenty thousand untreated persons of whom 90 per cent. might have been expected to die. The total cost of [the] operations during the year was Rs. 1,99,438-11-10, and if the saving of lives be estimated at 9/10ths of 19,659, then the cost of saving a life from *kala azar* may be estimated at Rs. 11-4-4, in which is also included the diminution in the risk to healthy persons of acquiring the disease."

"No formal malaria research . . . has been conducted"; and notwithstanding the enormous amount of money invested in the tea industry and the great size of the labour force, the local planters seem to be indifferent to the problems underlying malaria epidemics.

LE ROY DES BARRES (A.). *Rapport annuel sur le fonctionnement du bureau d'hygiène de la Ville de Hanoi, année 1921 [et 1922].—Bull. Soc. Méd.-Chirurg. Indo-chine.* 1922. Dec. Vol. 1. No. 2. pp. 3-19; 20-37.

Annual reports of the town of Hanoi, in French Indo-China, for the years 1921 and 1922. The population is approximately 110,000, made up largely of Annamites. There was a reduction of something like

27,000 in the population in 12 months which is not explained in the report. The death-rate was approximately 26 and the birth-rate 28 per thousand of the population. The greater part of the death-rate is contributed by malaria and tuberculosis, and in the year 1922 tetanus neonatorum.

SHANGHAI. Municipal Council. Public Health Department. Report of Commissioner of Public Health, 1922. [DAVIS (C. Noel), Commissioner of Public Health.]—61 pp. 1923. Shanghai: Kelly & Walsh, Ltd., 30, Ferry Road. [Price not stated.]

Statistical Summary.

Density of population within settlement limits: 149 persons per acre.

Number of inhabited houses:—

			Within limits.	Outside limits.
Foreign	..	..	3,720	1,074
Chinese	..	..	62,625	1,790

Population:—

Foreign	..	..	20,750	5,250
Chinese	..	..	814,000	—

Death-rate:—

Foreign Residents	..	..	19.3	per 1,000
Chinese	..	..	11.7	per 1,000

Total rainfall: 45.6 in.

“A total of 9,517 native deaths were reported as against 8,610 in 1921. Of the total of 9,517, 3,209 were children. This gives a death-rate of 11.7 per thousand, as against 11.0 in the previous year. Eighteen per cent. of the total native deaths were due to communicable diseases, excluding acute, or summer diarrhoea.”

Smallpox.—“Since commencing free vaccination work in 1904, the Department has performed a total of 226,301 vaccinations. Of these more than 66,000 were done during the past two years. It is estimated that 70 per cent. of the children under 5 years of age of the resident native population are thus protected against smallpox.”

Dysentery.—“Fourteen deaths were registered, compared with 21 in the previous year. Sixty per cent. of positive specimens in the laboratory were found to be from cases of bacillary origin. The usual high percentage of cases occurred in hotels and boarding houses where, as a rule, raw salads and fruit are served and prepared without proper foreign supervision.”

Typhoid and Paratyphoid Fevers.—A table shows “that typhoid is by far the most common form of enterica, with a maximum incidence in Sept.; that paratyphoid A accounts for about 11 per cent. of all cases and paratyphoid B for about 15 per cent. The figures for the paratyphoids are probably a little too low, as the formation of agglutinins is often weak in these diseases, and the patient may be convalescent before the test becomes positive.”

FEDERATED MALAY STATES. Medical Report for the Year 1922.
 [WOOD (F. E.), Acting Principal Medical Officer.]—71 pp.
Supplement to the F.M.S. Government Gazette. 1923. July 27.
 Kuala Lumpur. Govt. Press.

Total population, June, 1922, 1,360,876. Birth-rate, 25.65 per 1,000. Death-rate, 25.74 per 1,000. Infant mortality-rate, 170.83 per 1,000 children under one year of age, as compared with a rate of 183 for 1921.

The country was remarkably free from serious infectious disease during the year. No cholera was reported. The dysentery death-rate was 1.78 per 1,000 of the population, the lowest on record for 10 years. There was a slight increase in beriberi, polished rice now being easier to obtain and cheaper than undermilled or parboiled rice. The number of cases of yaws treated was 22,972, almost double the number of the previous year. Only a mild type of influenza has been prevalent. Ankylostomiasis death-rate, .41 per mille.

The malaria death-rate was 11.44 per mille of the population, being 44 per cent. of the general death-rate. Anti-malaria propaganda has been carried on with lantern lectures and demonstrations. Sanitary inspectors are trained in both laboratory and field work, and are competent to make Anophelene surveys. Spleen index has been taken on every estate and ever school inspected.

The corrected death-rates for pulmonary tuberculosis for the four large towns were: Taiping, 1.74; Seremban, 6.35; Kuala Lumpur, 3.33; Ipoh, 2.54.

PENANG. The Municipality of George Town. Health Officer's Annual Report for the Year 1922. [ROSE (J. Stuart), Municipal Health Officer.]—pp. 22 + 7. [Price 50 cents.]

Statistical Summary.

Rainfall, 1922 (average of three readings within municipal limits)	118.24 in.
Mean temperature, 1922	80.74° F.
Maximum	94° F.
Minimum	67° F.
Estimated population (mid-year)	125,834
Density of population	13,386 per sq. mile; 21.7 per acre
Crude death-rate	29.94 per mille
Infant mortality-rate	166 per thousand
Birth-rate	29.71 per mille

Tuberculosis produced 486 out of 637 deaths from infectious diseases, mostly among Chinese males.

BAGHDAD. Annual Report of the Health Department for the Year 1921. Being a Report on the Sanitary Circumstances, the Sanitary Administration and the Vital Statistics of Baghdad. [HEGGS (T. Barrett), Medical Officer of Health.]—55 pp. With 3 charts & 3 figs. 1922. Baghdad: Govt. Press.

The annual report of Baghdad is of very great interest and this is the first that has come up for review.

"The year has been one of consolidation rather than of progress. The long-awaited reorganization including an elected municipal council did not take place till early in 1922. Much which might have been

done was postponed waiting the election of this representative council, in order that the Government of the City and its health department should be democratic. The outstanding features of the year in the health of the city were (1) an epidemic of measles, which caused 710 deaths; (2) an epidemic of smallpox, with 109 deaths; and (3) an outbreak of plague in the spring, which caused 48 deaths.

" Apart from tuberculosis, Baghdad lost 1,000 lives in the year from infectious diseases. Tuberculosis itself was responsible for 704 deaths. This disease is normally the chief cause of death in the city. This fact calls for serious consideration. Next to infectious disease the greatest cause of death is enteritis or intestinal disease. This is one of the chief causes of the high infantile mortality in the city. . . .

" Baghdad from the point of view of its prevailing diseases is not a tropical city. The number of purely tropical diseases in Baghdad is exceedingly small. A little malaria exists (17 deaths in 250,000 people in a year), dermal leishmaniasis (Baghdad boils) is endemic, but is also found in Southern Europe, bilharzia is occasionally found and is always imported from the Euphrates, dysentery is rapidly diminishing as a purer water supply is provided. No cholera exists; plague, however, is endemic. The problems and work which face medical men here, whether clinical or administrative, do not differ widely from those of Europe. It is only a question of degree. We resemble, from a public health point of view, parts of Southern Europe. The mass of the disease is preventable. As usual, the greatest obstacle to the health reformer is lack of education and a low standard of living among the mass of the people. The climate is not unhealthy. The sterilizing sun, the pure rivers, the dry atmosphere and the cool northerly breezes, giving cool nights even in the summer, are natural features in favour of the maintenance of good health. A sufficient and wholesome water supply, drainage and sewerage admitting of the abolition of the universal cesspits, a good system of refuse collection and disposal, good methods of control of infectious disease, better ventilation of houses, less congestion of houses and more open spaces, less overcrowding of persons within the houses, better milk and food control, and more arrangements for bringing good medical attention within the reach of the poor, are the public health requirements.

" A strong national revival is now taking place and a sense of public responsibility and of the proper duties of citizenship will follow."

Climate.—Baghdad is 123 ft. above the level of the sea, and 6 in. of rain falls on an average of 26 days. Variation between night and day temperature is excessive. The mean variation is 26° and relative humidity varies between 20 per cent. in July and 80 per cent. in January.

The estimated population of the whole city is 250,000. The birth-rate is registered as only 8.1 per 1,000 of the population. This low figure is due to incorrect registration; the probabilities are that the birth-rate is 25 to 30.

The death-rate of the city as a whole is 22.6 per 1,000. Fifty per cent. of all deaths were of children under 5 years of age, 23 per cent. are deaths under 1 year of age. Thirty-two per cent. of the deaths are from infectious diseases. Tuberculosis alone is responsible for 12.4 per cent.; epidemic measles, smallpox, plague and typhus account for the remainder. Intestinal disease is also very common and accounts for 22.5 per cent. of the total death-rate, but is mostly

confined to children under 5 years. Respiratory diseases other than tuberculosis account for 13 per cent. of the deaths, which is not high. Fevers account for 6.5 per cent.; malaria is not a serious disease in Baghdad, but it has increased since the occupation by Indian troops. During the year under report there was a violent epidemic of smallpox, with 243 cases and 110 deaths. The absence of cholera during the year was largely due to the chlorination of the water supply. Thirty-nine cases of typhoid fever occurred, but there was no outbreak; they were probably either fly or carrier-borne. Dysentery is extremely badly reported in the city and the figures are worthless, but local practitioners consider it has greatly declined during recent years. As already stated, tuberculosis is the scourge of the city.

The water supply at present comes from several intakes. The water is chlorinated and 80 per cent. of the samples gave no faecal bacteria in 100 cc.

Drainage of Houses.—“The most marked sanitary defect of all the houses in Baghdad is the primitive method used for disposal of surface and waste water and night soil. In every house there are one or more cesspools built in the courtyard. These cesspools are deep, brick-lined pits roofed with flat brick with a small hole in the centre to admit the water. They are usually not cement-lined and the water entering them percolates into the subsoil. During the winter and spring the high level of subsoil water interferes with the percolation of the water from cesspools and these also sometimes fill up with subsoil water. All surface drainage and all domestic waste water goes into these pits and after a period of usage they frequently become foul and objectionable, a heavy sludge forming at the bottom. The foul odour from cesspools, especially on warm evenings, gives rise to much nuisance.

“The best remedy is the sewerage of the city, the only objection to which is the cost, so that cesspools must remain until it is possible for the municipality to face the cost of the main drainage of the city.”

BASRAH. *Annual Report of the Health Department, Basrah, for the Year 1921. Appendix to Annual Report of the Health Services, 1921.* [HALLINAN (T. J.), Medical Officer of Health, Ashar and Basrah.]—35 pp. With 1 map & 2 charts. 1922. Basrah: Times Press.

Climate.—“A chart shows the great variability of the climate in Basrah. The daily maximum temperature ranged during the year from 32.2 to 128.9, the latter temperature, recorded on the 17th July, being the highest temperature ever recorded in this country or in any other country, as far as can be ascertained from available foreign records. The daily difference between maximum and minimum dry readings varied from 17 degrees in winter months to 35 degrees in the summer months. The humidity varied from 92 per cent. in November to as low as 25 per cent. in the first week of August. The total rainfall during the year was 4.56 inches.”

The estimated population is about 50,000. Nine hundred and twenty-three births were reported, but the health officer considers that this figure was incorrect and is not worth formulation.

Death-rate, 33.7 for the whole year; in the third quarter (the hot weather season) it runs up to 42.08 per 1,000.

Causes of Death.—“Marasmus, debility and old age, 446; respiratory diseases, 325; malaria and fever, 197; infectious diseases, 160; intestinal diseases, 105.”

Infantile Mortality.—“ During the year 385, or 22.8 per cent., of the total deaths were of infants under one year of age, and 210, or 12.4 per cent., of the total deaths were of children between 1-5 years of age. That is 35.2 per cent. of the total deaths reported were of infants under 5 years of age.”

Child welfare work is done by two lady health visitors, who visit all births, and by the Women's Department of the Civil Hospital in the city. In time these visits are sure to improve the present figures.

“ An interesting example of the ignorance and superstition with which we have to deal was observed this year, when one of the food inspectors found a child being placed in the freshly-opened abdomen of a slaughtered cow as a cure for measles.”

Respiratory disease accounts for 19.2 per cent. of the total mortality, malaria 11.7 per cent., intestinal disease 6.2 per cent. Heat stroke is naturally fairly common during the month of July. Smallpox has been very prevalent during the current year, altogether 148 cases, with 69 deaths. Vaccination is fairly readily received by the people. Plague has occurred in two consecutive years; the disease was practically confined to the khan and grain storage areas. In the current year there were 44 cases, with 33 deaths.

The writer gives some interesting figures concerning the temperature.

“ Week ending	Mean daily temperature.	Humidity.	Total cases of plague during week.
April 16th	.. 83.8	42	Nil.
	.. 81.6	40	”
	.. 83.1	47	”
May 7th	.. 83.1	35	”
	.. 80.3	59	1
	.. 81.9	59	4
	.. 94.5	43	10
June 4th	.. 96.4	41	5
	.. 97.3	38	5
	.. 90.3	41	4
	.. 90.9	36	4
July 2nd	.. 99.9	36	4
	.. 104.5	35	5
	.. 104.9	38	2
	.. 105.7	51	Nil.

Epidemic ceased.

“ The above figures are of interest in view of the experience of the Indian Plague Commission, which found that a mean daily temperature of 85 degrees Fahrenheit was quite unfavourable for the spread of plague and that an atmospheric humidity of below 60 was also unfavourable. In this epidemic it is evident that the humidity, always below 60 and most of the time in the neighbourhood of 40, has had no appreciable effect on the course of the epidemic. The mean daily temperature was just below 85 degrees during the first two weeks of the epidemic, but for the succeeding eight weeks it was above 90 degrees, the epidemic not ceasing until the mean daily temperature was maintained at 104 degrees for two weeks. The minimum dry bulb temperature during the epidemic reached 81.5 on one week in the middle of the epidemic, but the epidemic continued until the minimum dry temperature maintained an average of over 85.5 for two weeks.”

We consider that it might reasonably be contended that 40 cases of human plague in a population of 50,000 people hardly amounted

to an epidemic as compared with some Indian and Manchurian experiences.

There has been no cholera this year.

Bilharzia.—“ The following facts concerning the disease are extracted from this [Dr. Hall's] report.

“ 1. Fifty per cent. of the population of school age are infected with bilharzia, the Mohammedan children to a greater extent than the Christian and Jewish children, on account of the Mohammedan children bathing more frequently in the creeks, where they are exposed to infection.

“ 2. Thirty-three per cent. of a batch of adult prisoners from the civil jail were found to be infected.

“ 3. The effect of the disease on the physical development is obvious. Infected children can be picked out from a class by their general appearance. The effect of the disease on the intelligence of the infected children does not appear to be appreciable.

“ 4. Intravenous injection of gr. 1 of tartar emetic in 10 per cent. solution, until a total dosage of gr. 10 had been given, produced apparent cure. Bilharzia ova had reappeared in 33 per cent. of children examined nine months after completion of the above course of treatment. Dr. Hall suggests that this may have been due to reinfestation during the summer, when the children indulged in frequent bathing.

“ It is worthy of note that although the community is so heavily infected, the civil hospital rarely finds that bilharzia has sufficient effect on the health of patients in hospital to justify either a special diagnosis or specific treatment.”

TANGANYIKA TERRITORY. Annual Medical Report. Annual Report of the Sanitation Branch of the Medical Department. Report of the Dar-es-Salaam Laboratory for the Year 1921. [SHIRCORE (J. O.), Acting Principal Medical Officer, Tanganyika Territory.]—232 pp. With 4 charts, 2 maps & 1 plan. [Date and place of publication not stated.]

The writer of the sanitation section of this report gives an interesting account of the general conditions of the Colony, which contains a few important towns and much very sparsely populated country. The population in 1921 numbered 4,124,338, namely, Europeans 2,447, Asiatics 14,991, Native Africans 4,106 900.

Birth and death-rates cannot be given, because registration is very far from complete. Infant mortality throughout the Colony is probably in the neighbourhood of 300 per 1,000 children born; on this subject “ Major Hon. C. Dundas, District Political Officer, Moshi, was so kind as to furnish the writer with a small statistical table which is not without interest. He collected statistics from 34 chiefs, mainly of the Wachagga, who inhabit the Kilimanjaro area. These 34 chiefs had between them 285 women, *i.e.*, nearly 9 wives apiece. These 285 women had produced 707 children, *i.e.*, 2.45 children per woman. But of the 707 children, only 405 survived to the limit of weaning (say 18 months to 2 years). Here then the infant mortality approximated 30 per cent. Now the Wachagga are a flourishing tribe. They have not been affected by serious pestilence nor by famine, and, as Major Dundas points out, these children had a naturally

better chance of survival than those of less wealthy and less fortunately situated natives. A further observation on infantile mortality has been made by Mr. MITCHELL, Assistant Political Officer. From his figures collected in the Ufipa District it appears that the number of wives per man was 2.5 and the number of children born per wife was 3.42. Of these children only 48.2 per cent. survived, *i.e.*, grew up. Further confirmatory figures were obtained by this officer from Kirando on Lake Tanganyika. Of 716 children 287 died under 2 years of age and another 93 before the 10th year, *i.e.*, 53 per cent. do not grow up."

Lymph Supply.—"Special precautions are taken in the despatch of the lymph. It travels by parcel post in the ordinary way, but it is packed in iced sawdust. At Kyambila, which is at least 14 days' journey by runner from the laboratory, 83 per cent. of primary vaccinations were successful."

Influenza was a very serious cause of death in this Colony. The writer says it looks very much as if influenza has established itself as one of the principal diseases in tropical Africa. Two outbreaks of plague occurred. There is great difficulty in tackling the disease on account of the very primitive nature of the houses; in fact, animals and human beings almost live in the same "boma," for protection from lions and leopards, which abound in the district. Under these circumstances rats are fairly numerous in the habitation and it is very difficult to get rid of them when plague is introduced.

Very interesting work has been done by Dr. HOWARTH, of Dar-es-Salaam, on the subject of coconut palms breeding mosquitoes. In 2,792 palms examined, 1,299 contained water and larvae. Fifty-nine per cent. held water, and 46.2 per cent. of these contained mosquito larvae. Dr. HOWARTH has demonstrated that there is water at the top of the palm trees, even in the dry weather. At this period of the year, larvae are found in 80 per cent. of the collections of water. It is obvious, therefore, however reluctant the administrative authorities are to move, that palm gardens must be removed from the neighbourhood of human habitations.

As regards malaria in Dar-es-Salaam, the figures are certainly disappointing. It would appear that two out of every five Europeans have been incapacitated something like 24 days in the year, in spite of very strenuous efforts on the part of the Health Department to combat the disease.

DURBAN. Report of the Medical Officer of Health for the Municipal Year ended 31st July, 1922. [MCNEILL (Katherine), Acting Medical Officer of Health.]—47 pp. 1923. Durban: Commercial Printing Co., 365, Pine Street.

Total population, 1922, 98,100, of whom 48,500 are Europeans. Gross European birth-rate, 26.83 per 1,000. Asiatic birth-rate, 51.62.

Death-rate per 1,000: Europeans 9.4, Africans 6.8, Asiatics 21.5.

Enteric Fever.—91 cases and 48 imported. Case mortality of 18.68 per cent. The cases in the town amongst Europeans occurred in 87 houses, in 83 of which water closets were fitted, four having the pail system. Obviously therefore the enteric does not bear any relation to house sanitation and is probably carrier borne.

Infant Mortality.—“A glance at the table of causes of death of infants under one year shows that the chief causes are (1) gastrointestinal disease; (2) prematurity, congenital debility and marasmus; (3) acute respiratory disease.”

“From what I have seen in Durban, both at the infant clinics and in visiting the maternity and other nursing homes in the town, it appears to me that the one thing that is most urgently wanted in Durban to-day is greater facilities for the training of midwives.

“Many midwives are trained in Durban; but under the existing conditions in the maternity homes the training is totally inadequate to turn out efficient midwives.”

SEYCHELLES. Annual Report on the Medical Department for the Year 1922. [ADDISON (J. B.), Chief Medical Officer.]—13 pp. 1923. Victoria, Seychelles: Govt. Printing Office.

Estimated population, 24,000. Birth-rate, 30.47. Death-rate, 13.92.

“There were no epidemics of any infectious or contagious disease during the year and the health of the population was exceptionally good.”

TRINIDAD & TOBAGO. Council Paper No. 56 of 1923. Vital Statistics.

Report of the Registrar-General for the Year 1922. [ROBINSON (A. C.)]—21 pp. 1923. Port-of-Spain: Govt. Printing Office. [Price 10d.]

Total population, 374,650. Birth-rate, 31.82 per mille. Death-rate 22.35 per mille. The most important causes of death were respiratory diseases and pulmonary tuberculosis, malaria, and bowel diseases, including diarrhoea, dysentery and enteric fever.

BRITISH HONDURAS. Medical Report for the Year 1922. [GANN (T. W. F.), P.M.O.]—pp. 19 + 6 + 3 + 2 + 2 + 3. 1923. Printed at H.M. Prison, Belize.

Birth-rate, 39.05. Death-rate, 61.5.

Yellow Fever.—Screening was carried out vigorously. Various experiments were made with larvivorous fish, and two species (identified by the Director of the Wellcome Bureau), namely, the Characnid *Tetragonopterus aeneus* (or “Billham”) and the Cichlid *Cichlasoma otofasciatum* (or “Crana”) were successfully used both in vats and iron tanks.

GOTSCHEILICH (Emil). Vergleichende Untersuchungen ueber die Sterblichkeit der eingeborenen und europäischen Bevölkerung in Alexandria. Ein Beitrag zur Hygiene des Lebens im warmen Klima. [The Comparative Mortality of Natives and Europeans in Alexandria. A Contribution to the Hygiene of Warm Climates.]—*Ztschr. f. Hyg. u. Infektionskr.* 1922. Dec. 9. Vol. 98. pp. 546-568. With 6 charts.

Mortality statistics of warm climates often lose much of their value by omitting to take into consideration the various races, the social positions, and other conditions of the inhabitants. The author was for 18 years (1896-1914) Head of the Sanitary Board of Alexandria, and apart from his own reports had access to those of other Health

Departments. For four or five months in the year the climate is subtropical, the mean temperature being between 23° and 25° C., and the relative humidity 70 to 80 per cent. The mortality rate amongst natives is double that amongst Europeans, and the excess is largely accounted for by the greater infantile death-rate of the former, who succumb to intestinal disorders in the warm season. Also the ratio of stillbirths among natives is to that among Europeans as 5 to 3, but the mortality during the first five years of life is as 3 to 1. We must bear in mind, however, that many Europeans leave Alexandria in the hottest months, and that, being in better circumstances, they live healthier lives. Above the age of 5 years the death-rates of natives and Europeans closely approximate, and, moreover, compare very favourably with most German towns, showing that Europeans can live and thrive in warm climates. Whereas the native birth-rate has remained practically stationary between 1896 and 1914, and the death-rate has only fallen 2·1 per mille, the birth-rate of Europeans has slightly increased, while the death-rate has dropped from 19 to 13·1 per mille.*

LURZ (R.). Geburtenhäufigkeit und Kindersterblichkeit bei den Rundi in Deutsch-Ostafrika. [The Birth Rate and Child Mortality amongst the Rundi in German East Africa.]—*Deut. Med. Woch.* 1922. Nov. 17, 24, Dec. 1, 8. Vol. 48. Nos. 46, 47, 48 & 49. pp. 1557-1558; 1586-1587; 1620-1621; & 1652-1653.

The author, in 1913-14, was in charge of a district in Urundi, to the north of Usumbura and Lake Tanganyika, and noticed that whereas children were few in the lower country they abounded in the hills, though the people were of the same race and intermarried. He set himself to find out the cause of this difference (*a*) by interrogating mothers as to how many children they had borne and how many had died, and (*b*) by personal examination of large numbers in each district. The results tallied and yielded the following information.

In the plains there was much malaria, in the hills little. In the plains infants remain well for two months; between the third month and the tenth year they suffer from frequent attacks of malaria, and many babies die; after the first year the spleen can be felt in 30-50 per cent. of children. Microfilariae appear in the blood from the third year and cause fever and headache. Intestinal worms appear as soon as the child can crawl. Yaws is frequent in children, late manifestations of yaws in adults.

In the hills many diseases are as common as in the plains, *e.g.*, leprosy and yaws, but malaria and ankylostomiasis are much less frequent. Splenic enlargement is found in only 8 per cent. of children and cardiac symptoms are half as frequent as in the plains. In some parts of the plains sleeping sickness is prevalent and increases the infant mortality.

In the hills the infantile mortality is only 8·5 per cent. against 24-31 per cent. in the plains. In the hills, moreover, more children are born: the author cannot give the reason with certainty, but in the plains malaria impairs the fertility. The average hills woman between 31 and 60 has 3-4 living children; the plains woman of the same age period, three children to two women; in one area women over 30 have at most one child. The author considers that he has demonstrated that

* Summarized by Dr. H. Harold Scott.

the high infantile mortality in one section of a tribe with the same abundant food, the same customs and beliefs as the rest, is caused by malaria.

In support of these conclusions he gives a mass of statistics, some of which may be cited. One hundred apparently healthy women between 50 and 60 in the Russissi valley had borne 290 living children, in the hills the same number had produced 607. According to the mothers, of 955 children born alive in the plains 43 per cent. had died, mostly under one year; of 1,451 hill children 29 per cent. had died, and only 8·5 per cent. under one year. Of 413 deaths in the plains 213, the majority in the wet season, were attributed to fever and heart weakness; of 424 in the hills only 67 were assigned to this cause. Death in these cases is sudden. Other figures show the effect of "yaws or syphilis" on the abortion and birth rates and on still births. It is so slight that yaws is probably the correct diagnosis. Yaws was a minor cause of death in children, forming less than 1 per cent.

The author examined 18,000 natives with a view to statistics of their age and sex. He concluded that after 40 their numbers rapidly go down. Persons over 50 were rare. In the plains males preponderated up to 20, females thereafter. The child count was unsatisfactory as many were hidden or sent away, but figures were obtained for children at the breast: in the Russissi valley there was one baby to every four or five women of child-bearing age, in the hills one to every three.

Figures are given for diseases diagnosed as the result of a single physical or blood examination of adults. Leprosy was seen in 0·5 to 1·6 per cent., yaws (or syphilis) in 5 to 9 per cent., malaria in 39 per cent. in the plains, and 11·7 in the hills, sleeping sickness in one part of the plains in 21 per cent., filariasis 91 in plains, 53 in hills.

A large number of children were similarly examined, about 3,000 in the plains and half that number in the hills. The following table shows some of the results:—

Disease.	Plains. (per cent.)	Hills. (per cent.)
Malaria	85-91	12
Filariasis	38-65	13
Ankylostomiasis	50-61	14
Enlarged Spleen	30-51	8
Frequent or Irregular Pulse	40-42	20

The type of malaria is not stated.

In the hill-children predominated round worms, ulceration of the legs, eczema and scabies.

MISCELLANEOUS.

BARRETT (James W.). **Town Planning in Relation to Health.—Health.** Melbourne. 1923. July. Vol. 1. No. 7. pp. 198-205. With 3 text figs.

The writer deals with the subject of town planning as a health measure. One portion of the paper is of particular interest to all resident in the tropics, namely, his criticisms of the type of house

which is used in Brisbane and Queensland, which is the tropical portion of Australia [Fig. 81]. He says the houses, with slight modifications, are similar to those constructed in the colder parts of Australia, and are very unsatisfactory. As the men work out of doors they suffer less as a result of this, but the women who stay in the houses suffer from nervous exhaustion and anaemia.

The writer gives some pictures of a really suitable tropical house designed for the U.S.A. in the Panama Canal Zone (see Figs. 82 and 83).

"These houses are built on piles of concrete or wood, well off the ground. The floors are solid and not hollow; either the whole house or the openings are protected by bronze wire gauze, and in most cases there are no gutters to the roof. The malarial mosquito breeds in small handfuls of water, and experience of the tropics has shown that defective guttering, which is usually overlooked, is a favourite breeding place. The rain-water from these houses tumbles off the roof and is carried away by open concrete drains. All the houses are sewered, and no one may erect a house except in a sewered locality. Consequently, these houses are proof against mosquitoes, flies and rats.

Surely the right course is to erect a model house or a model of a house in Queensland, and, once a design is approved, to standardize the parts and build them in quantity. A glance at the illustrations will show that there are no fences and no outhouses. The construction in Panama is simple. The United States Government has aimed at providing for the necessities of the case and no more."

The writer also gives an extremely interesting survey of the general subject of playing fields and the play ground movement in the United States of America.

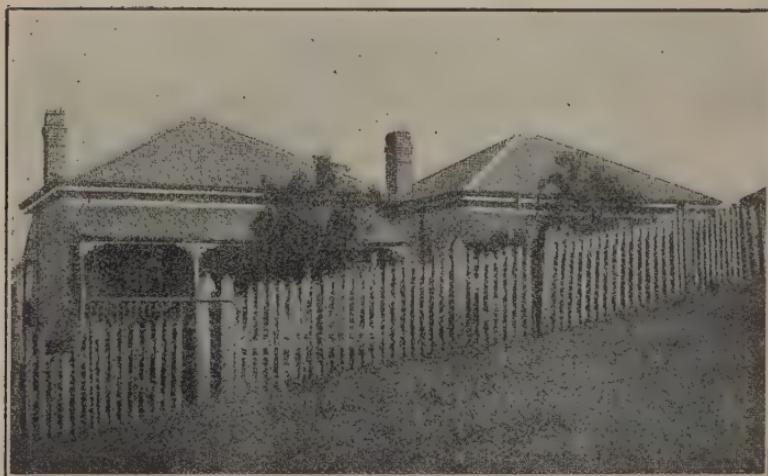


FIG. 81.—Unsuitable type of housing in Brisbane.

[Reproduced from *Health*, Melbourne.]



FIG. 82.—Cottages. One-Family Houses, Balboa, Canal Zone.

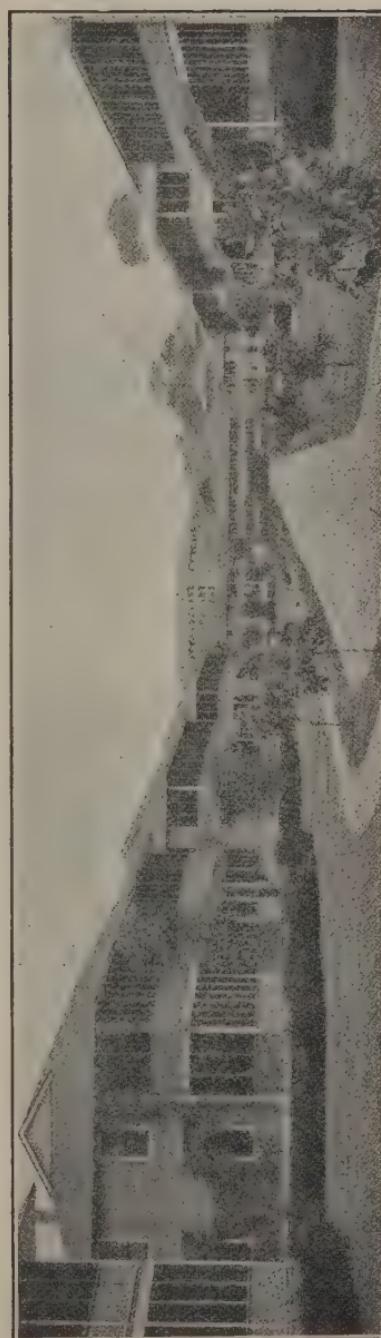


FIG. 83.—Four-Family Quarters, Balboa, Canal Zone.
[Reproduced from *Health*, Melbourne.]

INDIAN ENGINEERING. 1923. May 12. Vol. 73. No. 19. pp. 280-282.
With 2 figs.—Burma Engineering Congress, March, 1922.

Residential Buildings in Burma.—“The upshot of twenty years' experience was that nothing in Lower Burma on the plains was as good or comfortable as a double-storied or raised building, the bulk of the accommodation on the upper, or all on one floor. The lower storey (if such exists) ought to be a vast open space (the area included by the posts carrying the upper floor) with only two or three large rooms, well in the middle of the area, having brick walls at least 15 in. thick, including plaster. The upper storey wholly of wood, the ‘walls’ venetianed from floor to ceiling wherever there was space. (The lower rooms to be used during the hot weather regularly, but only for meals in wet weather, though no direct damp can penetrate.) In the extreme heat the lower rooms were always cool; and after 11 p.m. the upper storey had cooled down and gave a comfortable night, with the excellent through draughts of air from all sides. If in those days we had thought of non-conduction felting for the shingled roof, the upper storey would have cooled down by 9.30 p.m.

“The plan upstairs was roughly a cross with equal arms and shaft, so that every main room was open walled on three sides or nearly so. Where the winds were high and the rainfall excessive, as in Akyab, we fitted temporary weather shades, or jhamps, of bamboo and dhanni thatch outside the lower venetians and as high up as necessary, and closed in the verandahs in the same way. They kept out the rain, and when sloped outwards, let in the air. (In Akyab, a bed placed too close to a doorway, with a 10 ft. verandah and jhamps beyond, was quite damp, almost wet, in the morning and had to be dried in some way before it could again be used.) In Akyab the most comfortable house was a vast structure on one floor on piles about 6 ft. high, with enormous rooms, and free ventilation through and through every way. Wide verandahs or projecting eaves sheltered every wall in cyclones. Built of jungle wood and dhanni, the cost was surprisingly small, but the occupant would not have changed it for the finest brick house in Rangoon, however cunningly planned or expensively built. *It exactly suited the Akyab climate*—that was the sole reason—and was always dry and cool.” . . .

“Let us see how the Burmese peasant builds for himself in the delta, when free to do so [Fig. 84]. The house faces the south-west and is ridged with two slopes to the high pitched roof.

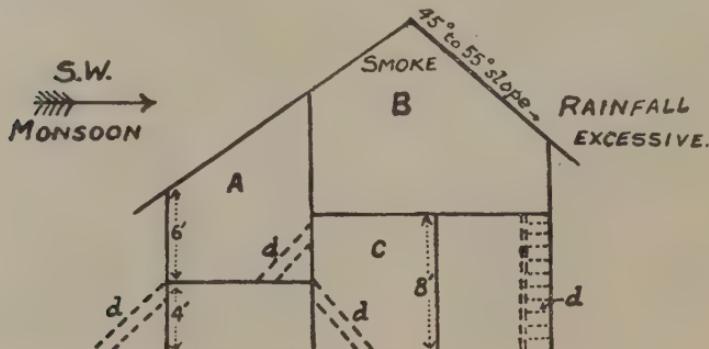


FIG. 84.—Section of Typical House of a Burmese Peasant.

[Reproduced from *Indian Engineering*.]

"A is a wide verandah open in front but fitted with jhamps when the rains commence. It is raised about 4 ft. sufficient for small children to pass under easily. B is the sleeping room, partitioned off as desired, capable of being opened back and front and raised above the saturated air line. C is the day room, for cooking, eating and the work of the house generally. The floor is rammed earth, raised a couple of feet if possible, sometimes paved with dry blocks. d are steps or ladders. The height of C is about 8 ft. floor to floor. A is the drawing room and parlour, and the women can get up into B to dress for visitors without being seen. The posts are jungle wood, the floors and roofs bamboo and thatch, the walls, where they exist, of coarse matting, or dhanni thatched, letting in the air. The flooring is split bamboo and also lets in air—and smoke when mosquitoes are active. A few valuable or valued animals sleep in C in mosquito-time."

SURVEYOR & MUNICIPAL & COUNTY ENGINEER. 1923. Feb. 16.
Vol. 63. No. 1622. p. 180. With 1 text fig.—**Destruction of Roadside Vegetation in Tropical Countries.**

"The enquiry, printed in our issue of January 26 last, from a Gold Coast reader, who asked for the name of the manufacturers and other particulars of an apparatus for destroying vegetation on the margins of roads, is answered by a correspondent, who forwards a description of the Hay flame projector which was used from the decks of the 'Vindictive' in the naval raid on Zeebrugge and has since been

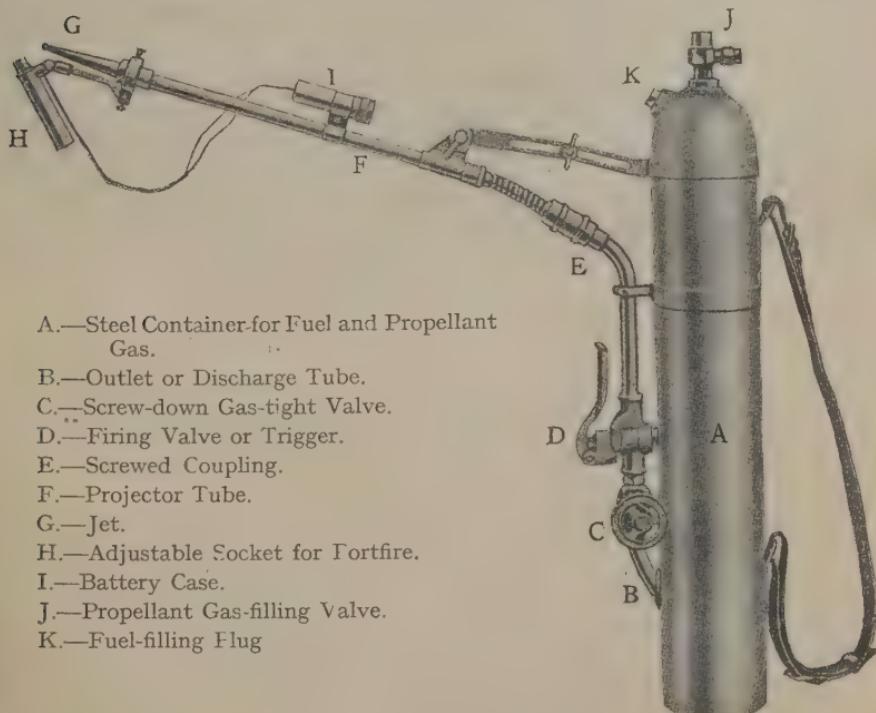


FIG. 85.—Details of the "Hay" Flame Gun.

[Reproduced from illustration supplied by Messrs. HUBBARD BROS., LTD.]

adapted as a destroyer of agricultural vermin in tropical and sub-tropical countries. The apparatus, which is manufactured by Messrs. Hubbard Bros., Ltd., Engineers, Basingstoke, Hants, weighs between 50 and 60 lb. when charged ready for use, and comprises a cylindrical steel container into which is filled a mixture of inflammable oils, together with a charge of inert gas at a pressure of 225 lb. per sq. in. The machine will project a continuous jet of liquid fire to a distance of from 80 to 90 ft., lasting for approximately half a minute, and it is claimed that it is so simple in design that it can be operated by any person of ordinary intelligence or by the average native, after a few minutes' instruction. Carrying-straps are provided to enable the outfit to be slung over the shoulder." [Figs. 85 and 86.]



FIG. 86.—The "Hay" Flame Gun in Operation (range of projection, 90 feet.). [Reproduced from illustration supplied by Messrs. HUBBARD BROS., LTD.]

ISERN (A. Fernós). *Anotaciones y observaciones derivadas del examen fisico de tres millares de niños de escuela puertorriqueños.*—[Deductions from the Physical Examination of 3,000 School Children in Porto Rico.]—*Bol. Asoc. Med. de Puerto Rico.* 1923. May. Vol. 17. No. 142. pp. 77-86.

A large proportion of the children, whose ages varied between 5 and 14 years, showed physical defects of one kind or another, only 12 per cent. being recorded as "normal." Several tables are given relative to the different diseases at various schools. The chief defects were: enlarged tonsils in 35 per cent.; dental caries in 66 per cent.; 64 per cent. were under weight for their age and showed signs of malnutrition. The author speaks of the possible connexion between the dental caries and the poor state of nutrition, but is of opinion that the latter, and possibly the former also, are themselves the result of insufficient and unsuitable food in earlier childhood.*

SAYERS (R. R.) & HARRINGTON (D.). **Physiological Effects of High Temperatures and Humidities with and without Air Movement. Effects on Body Temperature and Pulse Rate of Subjects at Rest.** —*Public Health Rep.* 1923. July 20. Vol. 38. No. 29. pp. 1616-1637. With 1 fig. [1 ref.]

The paper is a highly technical one; the details need not be given, but the summary is of very considerable importance to residents in the tropics. There is probably nothing new in the results, as most are verifications of personal experience.

“ **Summary.**

- “ A. Remaining at rest in saturated air at $91\frac{1}{2}$ ° F. for one hour,
 - “ With no air movement caused—
 - “ 1. An increase in body temperature ;
 - “ 2. A moderate increase in pulse rate ;
 - “ 3. Profuse sweating ;
 - “ 4. After-effects of dizziness and weakness.
 - “ With air movement caused—
 - “ 1. Slight or no increase in body temperature ;
 - “ 2. Slight increase in pulse rate ;
 - “ 3. Slight perspiration ;
 - “ 4. No after-effects ;
 - “ 5. No ill-effects at any time ; but the noise of the fan was annoying.
- “ B. Remaining at rest in saturated air at 95° for one hour,
 - “ With no air movement caused—
 - “ 1. An increase in body temperature ;
 - “ 2. A marked increase in pulse rate ;
 - “ 3. Very profuse sweating, clothing being saturated with perspiration and sweat in shoes of all subjects ;
 - “ 4. Dizziness on movement and increase in depth and rate of respiration (puffing somewhat on slight movement) ; chilly sensations in some subjects.
 - “ With air movement (250 to 600 linear feet per minute) caused—
 - “ 1. Slight or no rise in body temperature ;
 - “ 2. Slight or no rise in pulse rate ;
 - “ 3. Profuse sweating, but not sufficient to wet all clothing ;
 - “ 4. No untoward symptoms in subjects other than profuse sweating.
- “ C. Remaining at rest in saturated air at 96° , still and moving, caused the subjects to experience symptoms practically the same as those felt in still or moving saturated air respectively at 95° F.
- “ D. Remaining at rest in saturated air at $98\frac{1}{2}$ ° F. for one hour,
 - “ With air movement caused—
 - “ 1. An increase in body temperature ;
 - “ 2. An increase in pulse rate (in one case to 183) ;
 - “ 3. Very profuse sweating, clothing being saturated (sweat could be poured from shoes) ;
 - “ 4. Dizziness on movement. All felt that little work could be done at this temperature and that the conditions were much worse than in moving saturated air at 95° , but not as bad as moving saturated air at 100° F.

"E. Remaining at rest in saturated air at 100° F.,

"With no air movement caused—

"1. A marked rise in body temperature which reached 102.3° F.;

"2. A marked rise in pulse rate, varying in different subjects from 152 to more than 175;

"3. Profuse sweating, the shoes being partly filled with perspiration;

"4. Early appearance of dizziness, weakness, and persistence of symptoms for about one hour after test. The test was very trying.

"With air movement (200 to 800 linear feet per minute) caused—

"All the above symptoms, and no subject remained a full hour.

"The untoward effects upon man of almost saturated air with temperature above 90° F. and below 98° F. are much less when the air is moving than when it is still. Further, the output or work that can be done is greater when the air is moving than when it is still, with the above temperature and humidity.

"No beneficial effects were found by moving saturated air at 98.6° or 100° F., even at high velocities; and there was apparently some disadvantage."

DINGUIZLI. *Les prières musulmanes et leurs rapports avec l'hygiène.*—

Bull. Acad. Med. Paris. 1923. Jan. 30. (3rd Ser.) Vol. 89. No. 5. pp. 181-186.

—. *Des réformes hygiéniques à introduire chez les populations musulmanes de Tunisie.*—*Ibid.* Feb. 13. Vol. 89. No. 7. pp. 233-236.

These short papers give an account of the ordinances regarding personal and household cleanliness enjoined by the Koran. They are already pretty well known to most people in the East.

The first paper deals with the hygienic aspect of the Mohammedan prayers, particularly the special ablution prior to reciting prayers and the genuflexions and movements of the body that are laid down. Dinguzli considers these to be extremely beneficial to health, apart from their religious aspect.

CORONADO (Ch.). *Les charges inutiles de l'armement, la Patente de*

Santé.—*Rev. Méd. et Hyg. Trop.* 1923. May-June. Vol. 15. No. 3. pp. 103-108.

The writer discusses the uselessness (and expense) of the ordinary ship's bill of health. One can understand that in bygone days, when the ship itself was the only means of inter-oceanic communication, the statements of the ship's captain as to the health of his ports of departure and passage required investigation; but at the present time the ship's bill of health is an expensive and sometimes even dangerous nuisance.

With these conclusions we are in agreement. The English attitude has always been that examination of ships and crew on arrival is the only criterion as to whether it is infected, irrespective of the conditions of health of the port of departure.

SAVAGE (William G.) & HUNWICKE (R. F.). *Studies in Sweetened and Unsweetened (Evaporated) Condensed Milk.*—*Dept. of Scientific & Indust. Research. Food Investigation Board. Special Report No. 13.* 103 pp. With 2 figs. 1923. London : H.M. Stationery Office. [Price 4s. net.]

This report is a very considerable pamphlet of 103 pages dealing with the manufacture and the bacteriology of condensed milk, both sweetened and unsweetened, also with the contaminating organisms and yeasts. Those interested in food supplies should consult the original. The following short excerpts are given :—

“ From the practical point of view, the most important feature of our results is the fact that decomposition is nearly always due to non-sporing types, and that what the manufacturer has essentially to guard against are—

“ (a) The survival of non-sporing bacilli, especially the more resistant types of micrococci ; and

“ (b) The admission of air through minute leaks which may enable dormant forms to multiply and cause decomposition changes.

“ It is also evident that it is far preferable to endeavour to keep the bacteria out of the finished condensed milk than to have to kill them in this concentrated milk.

“ The sources of bacterial contamination and multiplication are mainly the following : from the milk, from the air of the factory, and from dirty pipes and apparatus, while multiplication of added bacteria may occur.

“ Milk as received at the factories contains very large numbers of bacteria and the preliminary heating it receives is a very necessary precaution. From the bacteriological point of view it would be an advantage if this was always done at a temperature of 100° C. and for some time (10 minutes) rather than a mere pasteurization. It is far easier to kill out the bacteria in raw milk than in the tins of concentrated milk.

“ In a clean factory bacterial additions from the air are not likely to be very numerous if proper precautions are adopted. The importance of all pipes having right-angle joints and being taken down and scrubbed out daily need not be insisted upon. We have traced heavy bacterial contamination to inadequately cleansed pipes. The mere passing of live steam through the pipes is quite ineffective. Opportunities for multiplication of surviving or added bacteria are not always as limited as they might be. While all the stages up to the cooling of the evaporated milk are usually carried on in rapid succession, the cooled milk is not always canned the same day. It may be left over until next day or even over a Sunday as well, and this gives an opportunity for bacterial multiplication. There is not only the danger that some bacteria may survive sterilization, but that the increased acidity may cause the milk to coagulate in processing.

“ As regards the viability of micrococci in unsweetened condensed milk at different temperatures, we have only carried out a few experiments, but all the strains tested survived 10 minutes at 60° C., plus 5 minutes at 70° C., the temperatures being those actually reached in the milk. All died when the temperature was raised to 80° C., the time taken to rise from 70° C. to 80° C. being 3 minutes. If our suggestion that it is the micrococci and other non-sporing forms which

are the chief danger proves to be widely applicable, then it seems probable that a longer processing at a lower temperature would give results equally as good as a shorter time at a higher temperature, and that there would be less risk of the milk being damaged."

NAÑAGAS (Juan C.). [In English & Spanish.] **Co-operation necessary between Medical Associations and the Government in the Philippines on Legislation pertaining to Medical and Public Health Matters.** Cooperacion necesaria entre las asociaciones medicas nacionales y el gobierno en Filipinas sobre medidas legislativas relativas a asuntos medicos y sanitarios.—*Jl. Philippine Islands Med. Assoc.* 1923. May-June. Vol. 3. No. 3. In English, pp. 131-135. In Spanish, pp. 159-162.

The writer describes the activities of the body known as the American Medical Association and its influence on general legislation. He argues that the three societies which in a way corresponds with that body in the Philippine Islands, namely, the Philippine Islands Medical Association, the Manila Medical Association, and the Colegio Medico-Farmaceutico de Filipinas, should unite and work on similar lines to the Association in America.

HEALTH FORUM.—Official Organ of the Public Health Association of Australasia. 1923. Mar. Vol. 1. No. 1. [Editorial Office: 51, Spring Street, Melbourne.]

This new journal published quarterly is the official organ of the Public Health Association of Australasia. We gather that it is not intended solely for medical men, but for all interested in public health matters. This number contains the following papers: "Housing and Health," by H. W. PALMER, M.B., Ch.M.; "Hospital Dietetics," by C. E. CORLETTE, M.D.; "The Prevention of Hookworm Disease," by W. A. SAWYER, M.D.; "The Mental Hygiene Movement and Organization in Australia," by E. Morris MILLER, M.A.; (Leading Articles) "The Association and its Journal" and "Does Prevention Pay"; "The Best Methods of Insuring Safe Milk Supplies."

The paper on hookworm disease gives a popular description of the method of infection and the life-history of the worm itself. That on the milk supply is an extremely able article, going into great detail, and, we imagine, is considerably above the heads of the ordinary public. The journal is to be obtained from "The Health Forum," 51, Spring Street, Melbourne, subscription price 10s. a volume of four numbers (March to December): single copies 2s. 6d.

BOOK REVIEW.

RUSSELL (A. J. H.) [M.D., D.P.H., D.T.M., Major I.M.S., Director of Public Health, Madras.] **McNally's Sanitary Handbook for India.**—6th Edition, revised and rewritten. pp. xviii + 476, 1923. Madras: Government Press. [Price 4 rupees 8 annas.]

The fifth edition of this book was published in 1916, and in the preface occur the following words:—"McNally's Sanitary Handbook for India was originally published in 1889. It was written with special reference to the Madras Presidency, and was intended for the use of district and municipal sanitary officers, members of municipal councils and local boards, and for medical students and sanitary inspectors." From the preface of the sixth and present edition it appears that the book is intended for the same class of readers. The preface to the first and second editions states that the book "is addressed primarily to the educated classes, in the hope that it may afford them information which is important to all—as life and health are important—and which may serve to benefit them, and, through them, the great uneducated masses of the people."

It appears, then, that the late editions have been intended to appeal to the professional as well as to the lay reader. It would be a difficult matter to write a book suitable for such a diversity of persons and there is the danger of "falling between two stools" in any such attempt. To appeal to district and municipal sanitary officers (who would naturally have been selected from amongst expert professional men) a book must contain much advanced technical knowledge and this would probably be beyond the grasp of the layman who is a member of municipal councils and local boards.

One object of a book review is to help people to decide whether they will buy the book or not. Accordingly it is necessary to indicate in the present instance whether the handbook efficiently caters for the whole group for which it has been written. It must be said that there is not sufficient detailed and advanced technical knowledge of value to a sanitary officer to render the book of much use to him in his work. He could not rely on its teachings as a work of reference or even as a sufficient guide to be a *vade-mecum* in all his routine duties, except as regards certain chapters such as that on Infant Mortality, Child Welfare and Maternity Relief.

As an instance of shortcoming in the above respect, one may take the information given regarding kala-azar, a disease of much importance in India, and, moreover, endemic in Madras. Under this heading two references are made, one, on p. 253, consisting of six lines, and the other, on p. 278, consisting of four lines.

Sometimes, also, the information given is not correct or is out-of-date. To quote one example, the particulars supplied as regards *Schistosomum haematobium* consist of the following: "This trematode is very common in Egypt, but is also to be met with in India. The worms live in the portal vein, and pass to the veins of the bladder and rectum in order to lay their eggs. The ova, which usually have a lateral or terminal sharp spine, pass out with the urine and faeces, and hatch out if they reach water. The embryos pass into the bodies of certain fresh water arthropods, and man becomes infected by drinking water containing these small animals." On p. 44 *Filaria sanguinis hominis* is detailed as one of the parasites spread by water. In dealing with anaerobic treatment of sewage in septic tanks, it is apparently recommended that the tank be made large enough to hold 24 hours' flow; so long a period of retention has for many years been recognized as unnecessary and undesirable. Recent work on ankylostomiasis has apparently not been noted, as on p. 262 it is stated that the embryo can survive outside the body for so long as a year.

Such teachings are inaccurate and should not exist in a text book designed for sanitary inspectors or medical students. Incorrect knowledge once acquired is sometimes very difficult to eradicate.

In spite of the above criticisms there is much valuable information in the book, which aspires to cover a large section of public health work. Especially commendable is the new chapter on "Child Welfare and Maternity Relief," which is well worth careful study. Lay readers, sanitary inspectors, and, to a less degree, medical students will find much of value within its pages. It is obvious that the publication has appealed to many, otherwise six editions would never have been called for. The printing is clear and the type used is of sufficient size for comfortable reading.

G. E. F. Stammers.